# WIRED

May 1996

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Sex and Death among the Cyborgs

Merchants of Venom
Bruce Sterling on attack ads, in The Netizen

BeBox's Jean-Louis Gassée

## Who are these YAHOOs, anyway?

Steve Steinberg on the quest for the ultimate index.

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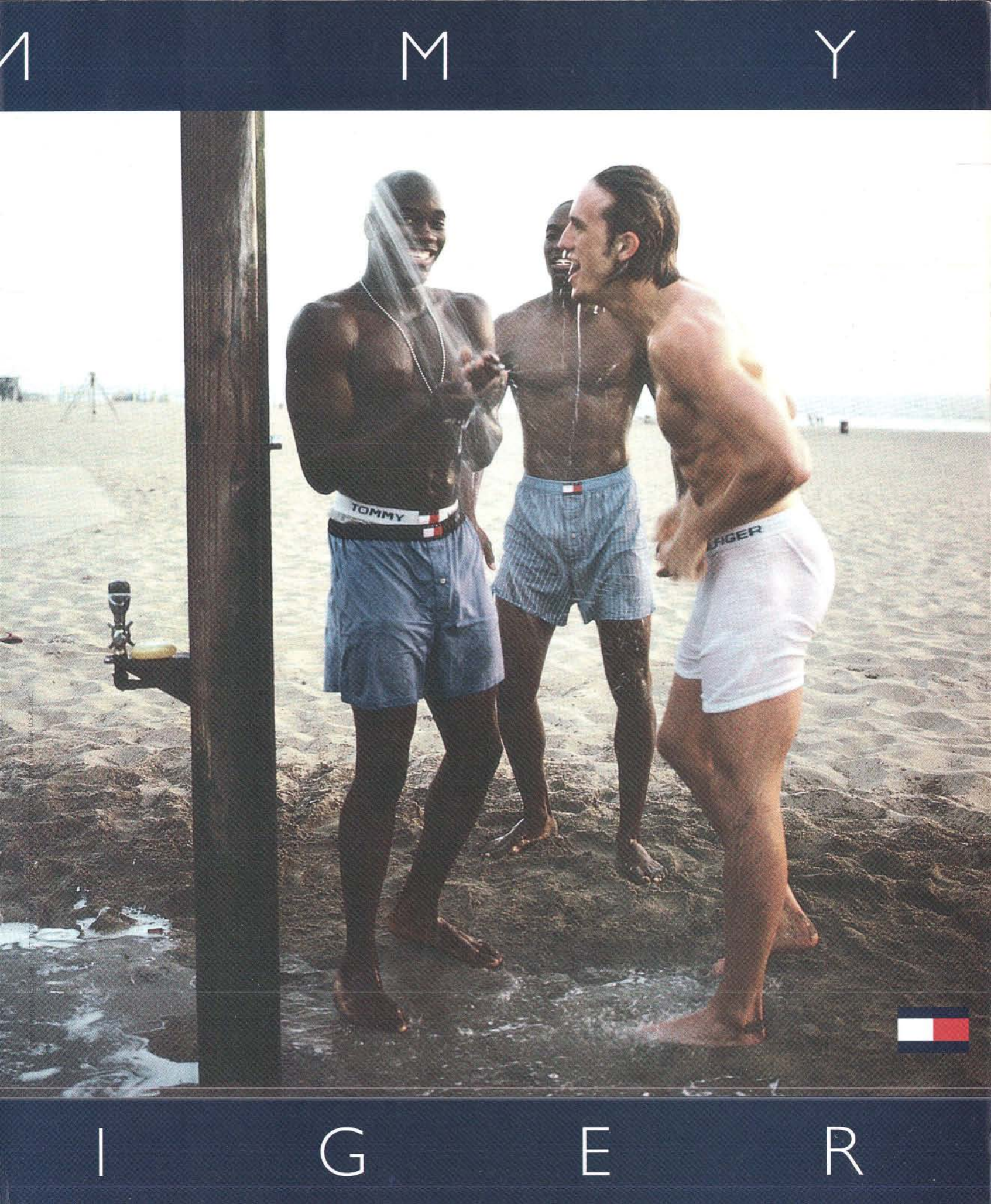
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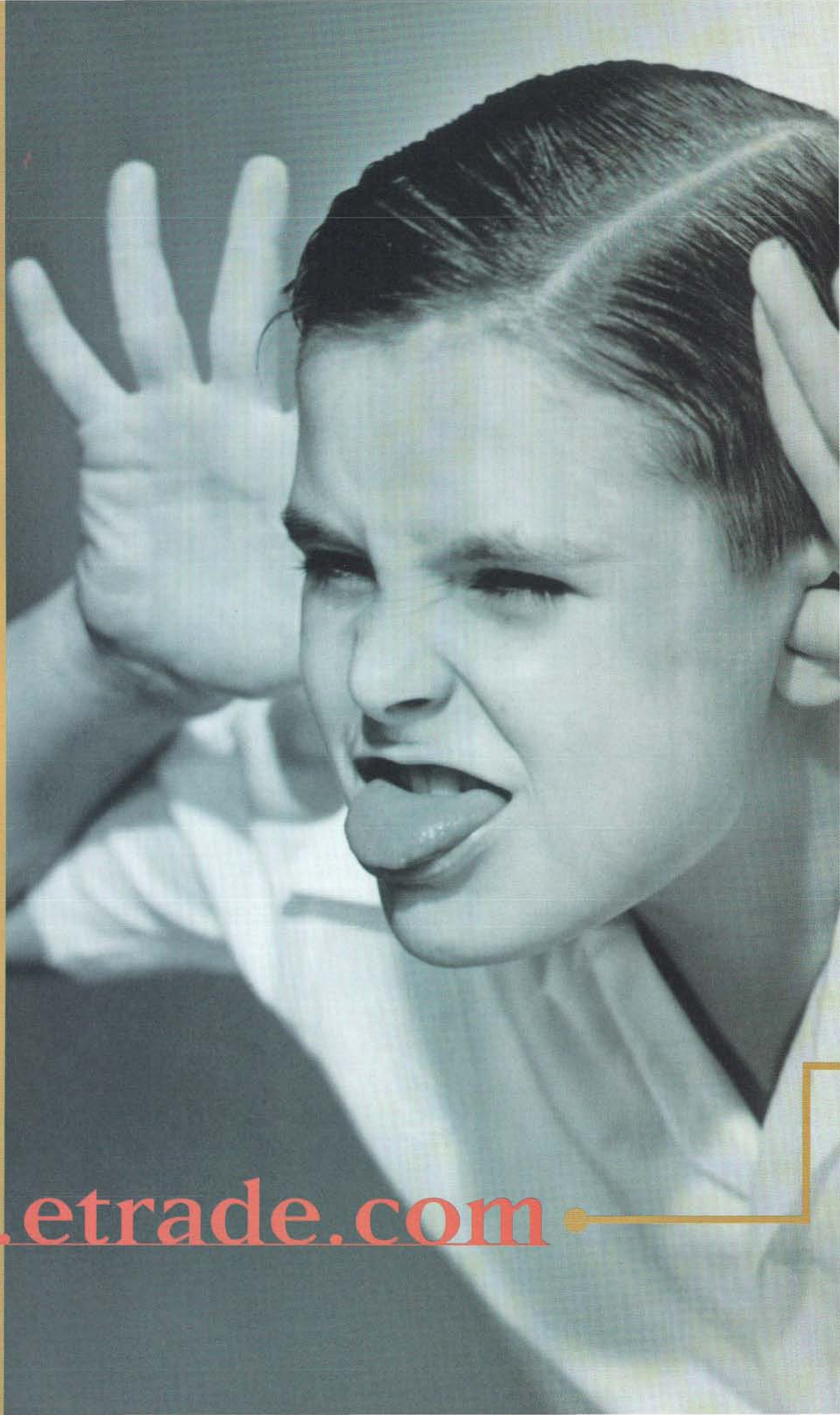

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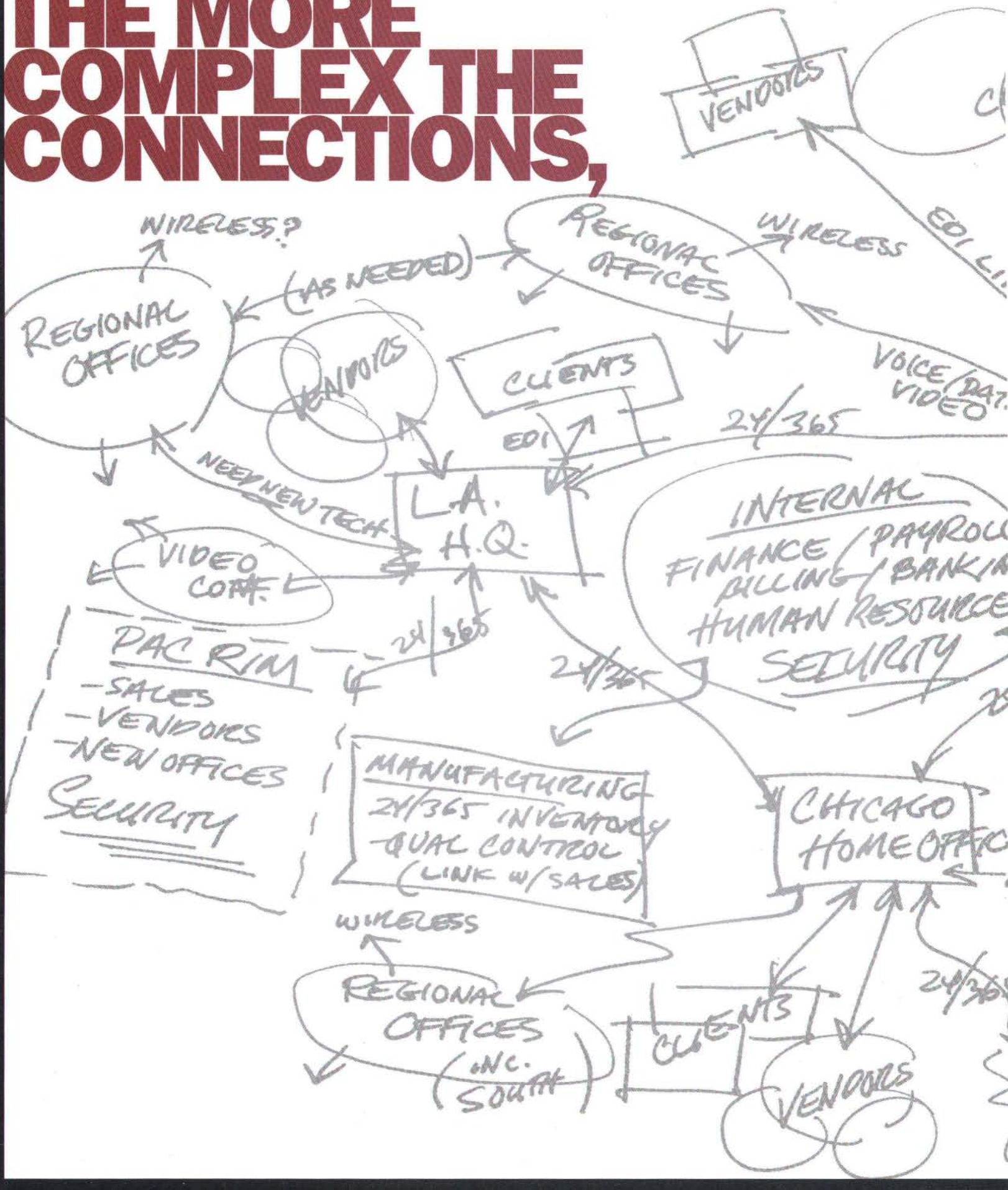

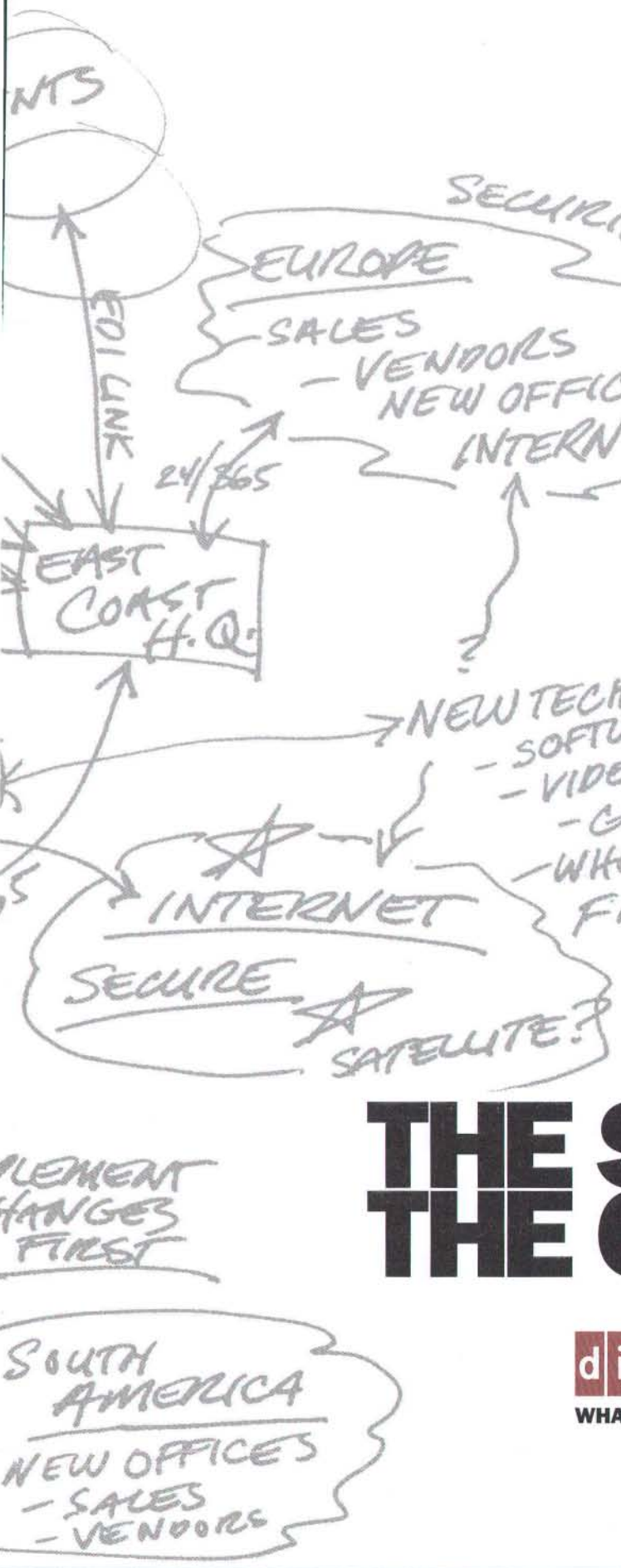


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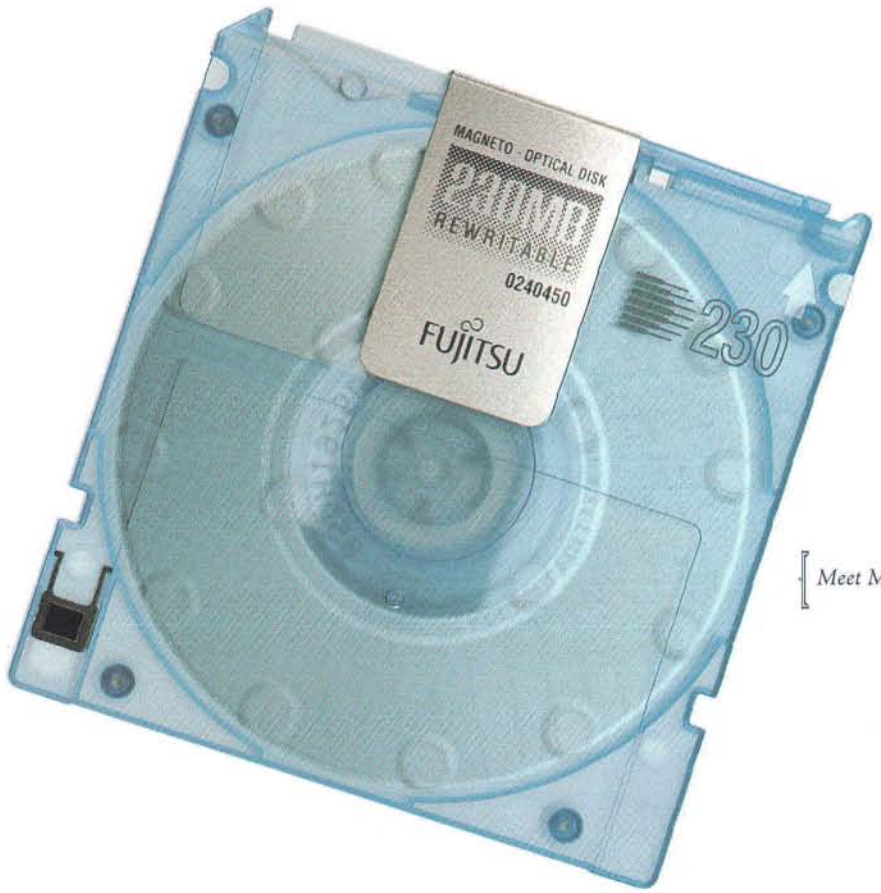


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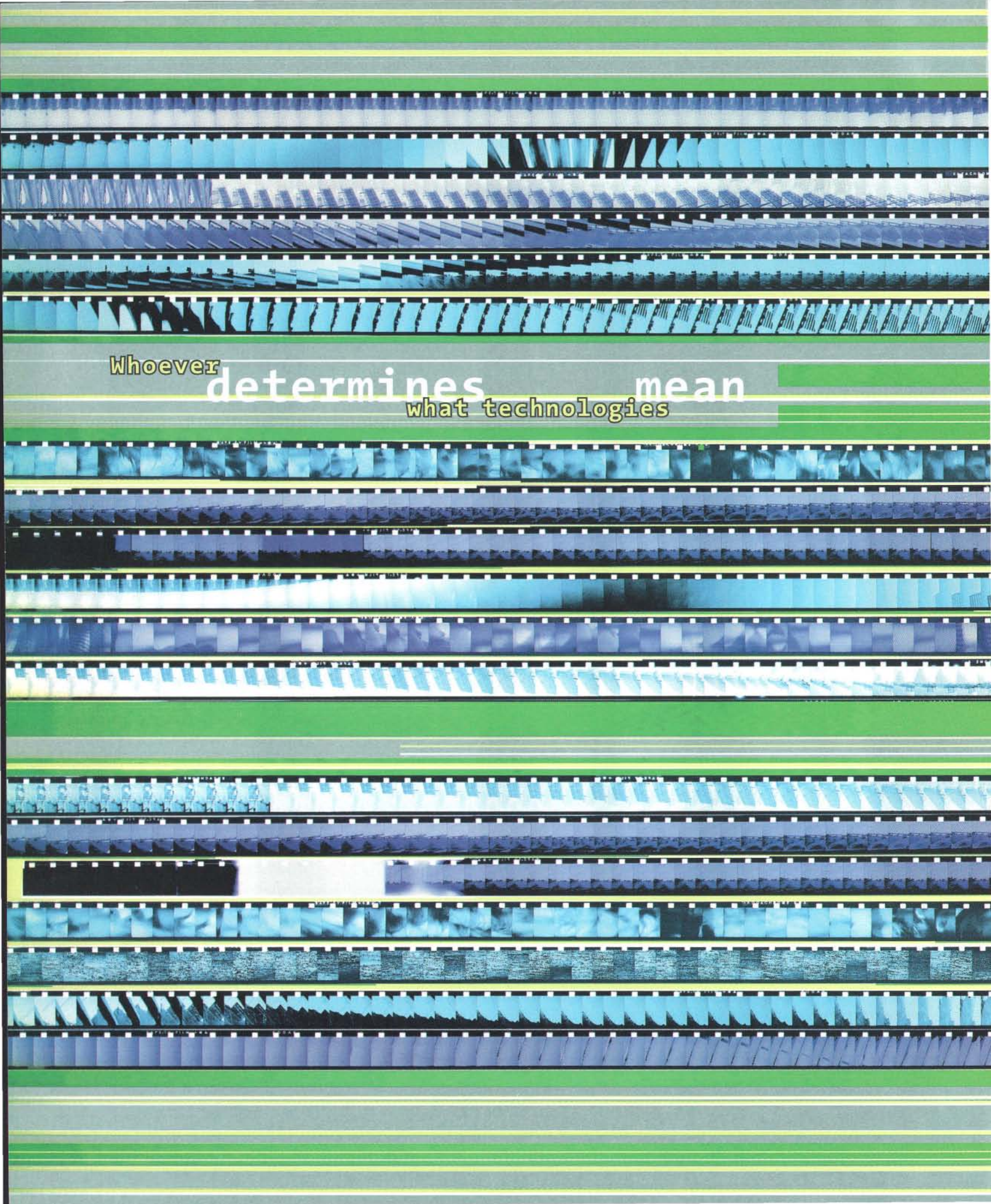
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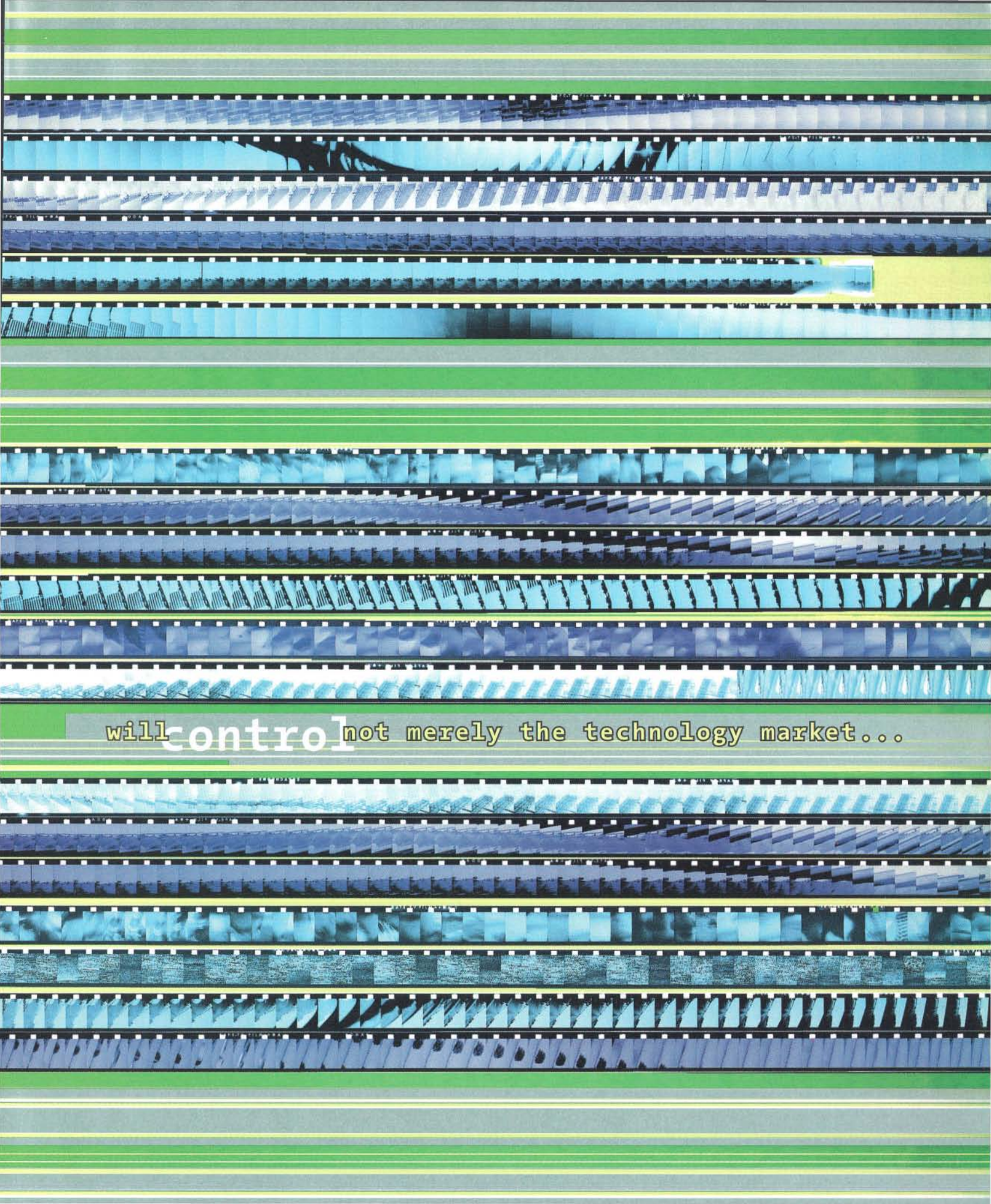
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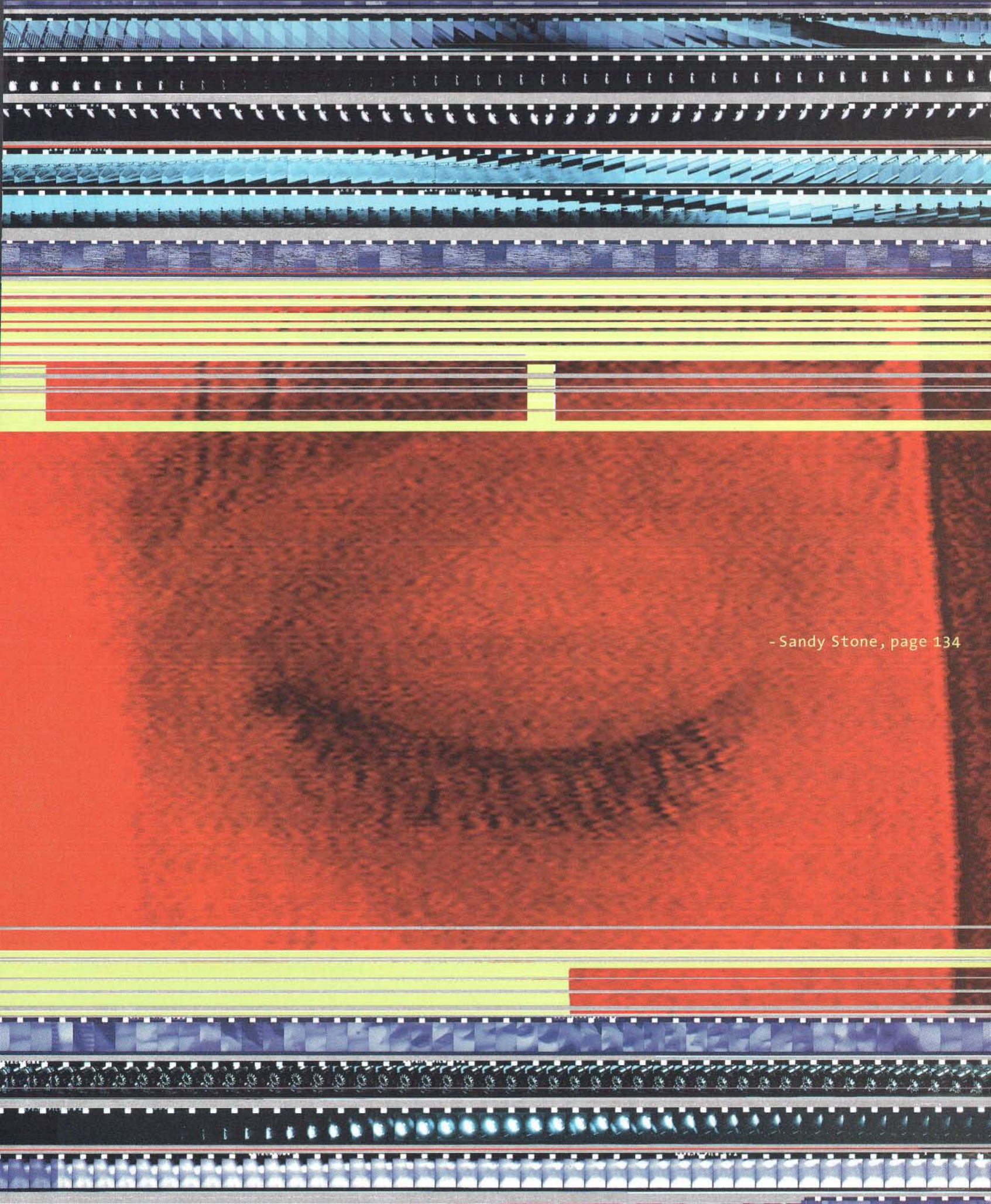

- Sandy Stone, page 134

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WIRED

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Introduction: Glenn Bair.
Hmong translation courtesy of Direct Language Communications Inc.

## The Netizen: Merchants of Venom

Bruce Sterling looks back at the GOP's dirty TV war in New Hampshire.
John Heilemann talks with *Hotline*'s Doug Bailey on why the best ads are the worst.



## Seek and Ye Shall Find (Maybe)

The most popular sites on the Web today are trying to bring order out of chaos in a frantic quest for the ultimate index of all human knowledge. By Steve G. Steinberg



## Barracuda

Digitally submerging New York's subways, photographer Meryl Meisler literalizes the idea of a sea of people. By Phil Patton.



## Who Can I Turn To?

Three a.m. Your Alzheimer's spouse won't let you sleep. Community is as close as your keyboard. By Michelle Slatalla



## Speed Pollution

According to Paul Virilio, real time is prevailing over real space, reducing the world to nothing. By James Der Derian



## Geek Cheek

Today, what's making Jean-Louis Gassée's nipples hard isn't Apple, it's his ultimate boy toy, the BeBox. By David Diamond



## Touchstone

If you want to know what's really real in new media, you ask Mary Modahl. By Harvey Blume



## Insanely Great – or just plain Insane?

Could this rocket helicopter be the space equivalent of the personal computer? By Gary C. Hudson



## Vowel Movements

Using his computer-manipulated face, Takahiko Iimura articulates the distance between Japanese and English. By Jackie Bennion



## Sex and Death among the Cyborgs

Sandy Stone knows that eroding boundaries between us and our prostheses – contact lenses to communication networks – have already turned us into transhumans. By Susan Stryker

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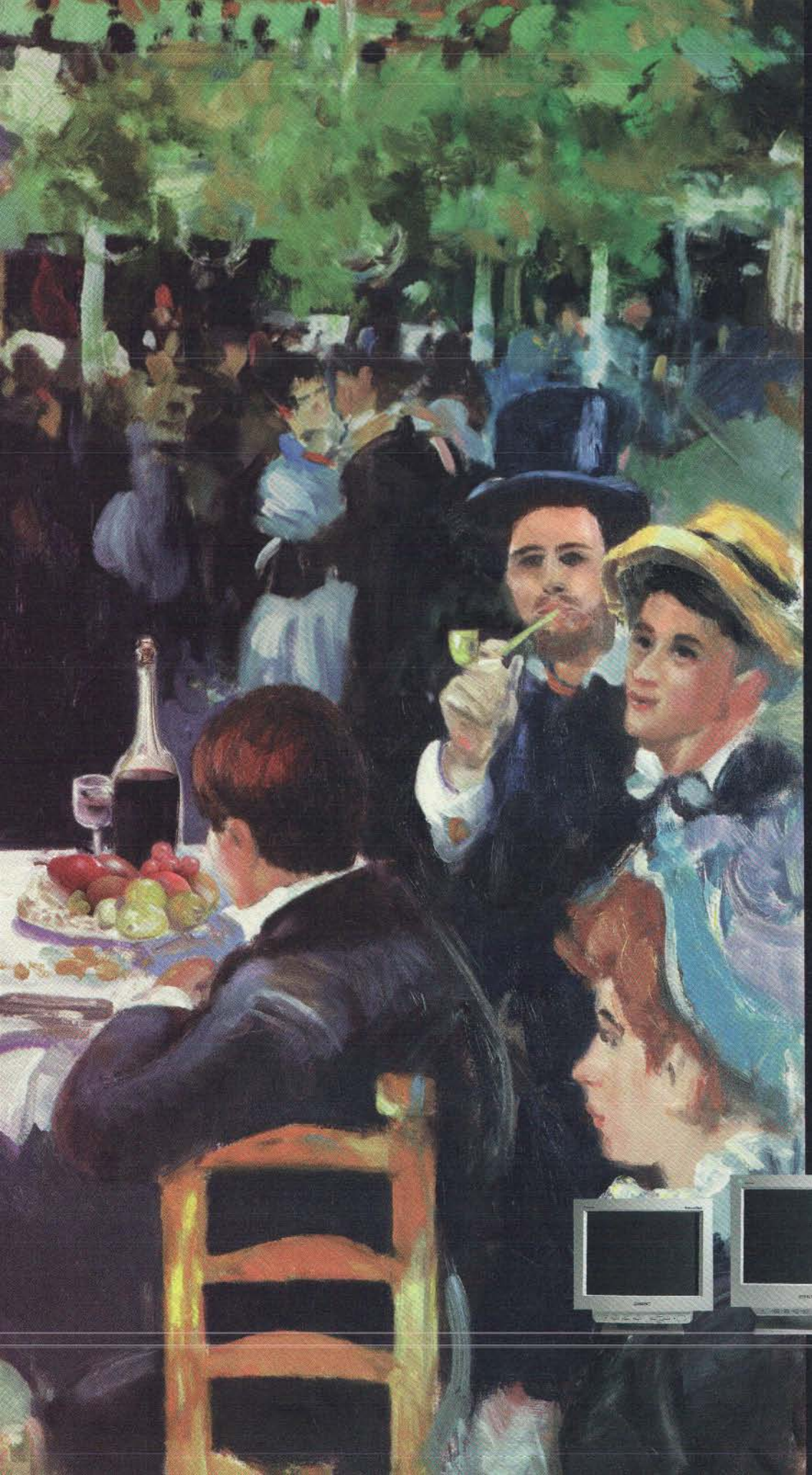

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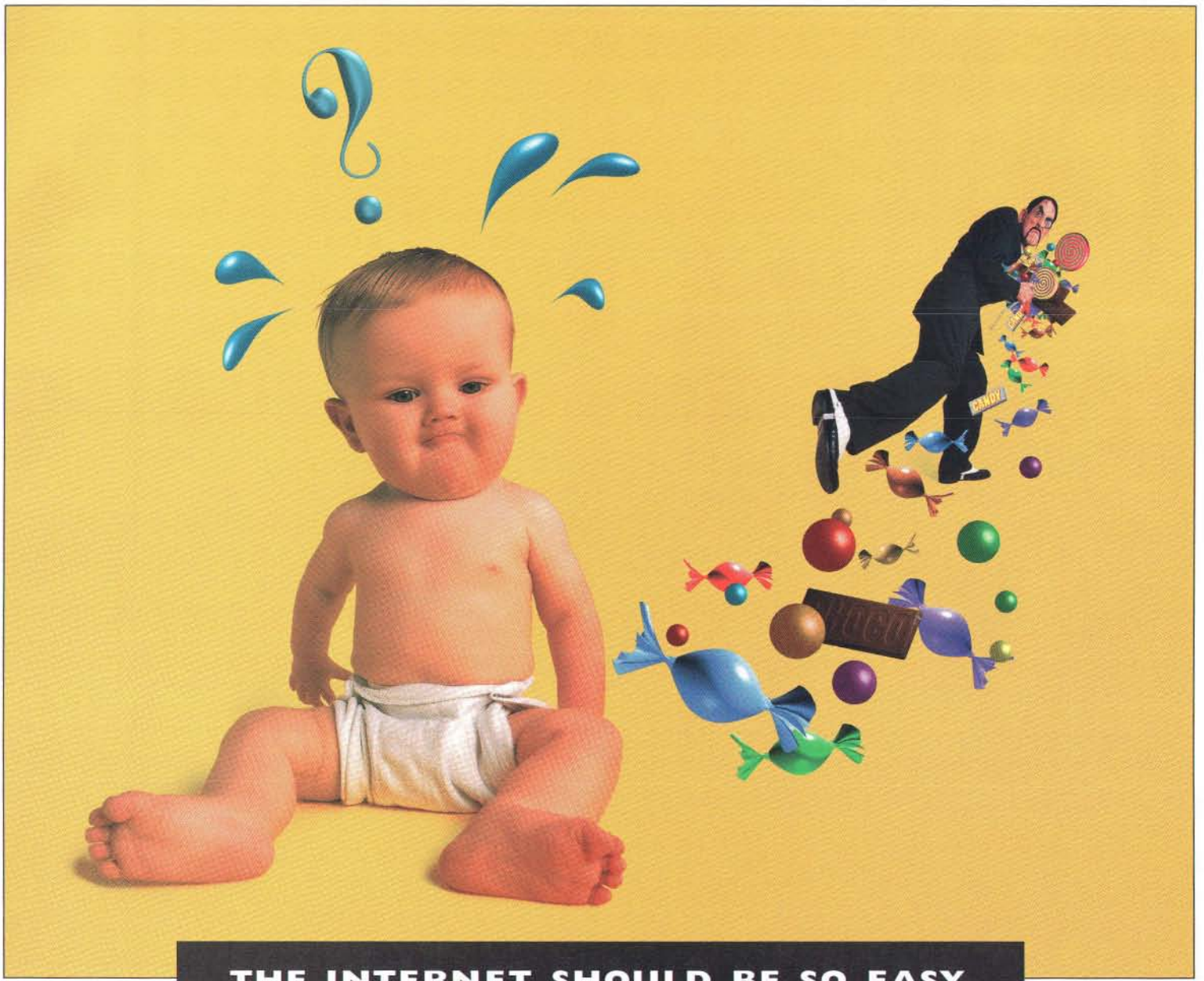


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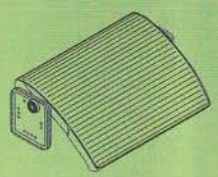

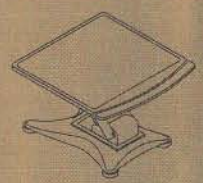

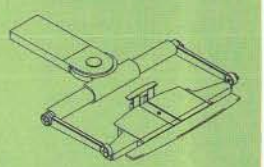

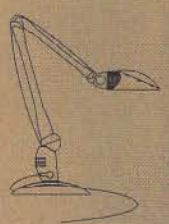

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# Rants & Raves

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### The Jobs Performance Review

The Steve Jobs of the present paints a realistic worldview ("Steve Jobs," *Wired* 4.02, page 102). He acknowledges the "dumbing down" of the species through mass media and presents an impression of the marketplace smattered with ideologies that would make Ayn Rand break into an anticipatory sweat. Gary Wolf seems dismayed by the attitudes of the '90s Jobs and imparts a longing for the optimistic, "Gee, let's change the world" Jobs of the past to tell him that everything's gonna be all right. Wake up, Wolf. We all evolve. As a friend of mine is fond of saying, "If you're not a liberal when you're young ... you have no heart. If you're not a conservative when you're old ... you have no brain."

Jobs's consistency is his ability to predict and direct the public's desires and to create the means to fulfill them. He has maintained his status as an industry icon and continues to be one of the true visionaries in a rapidly changing technological atmosphere.

**W. Scott Koenig**
**skoenig@qualcomm.com**

Steve Jobs should stick to technology and not make pronouncements on public policy. He lays the blame for problems in education at the door of the National Education Association. With absolutely no evidence, Jobs links the rise in education unions to falling SAT scores. It would be more fruitful to analyze declining education budgets (California in the post-Prop. 13 era is a textbook case), low teacher salaries, rising unemployment, and crumbling social services for both children and parents. On his way home from collecting his daughter from her expensive private school, Jobs should run in to a bookstore and pick up a copy of *Savage Inequalities* by Jonathan Kozol.

**Michael Levy**
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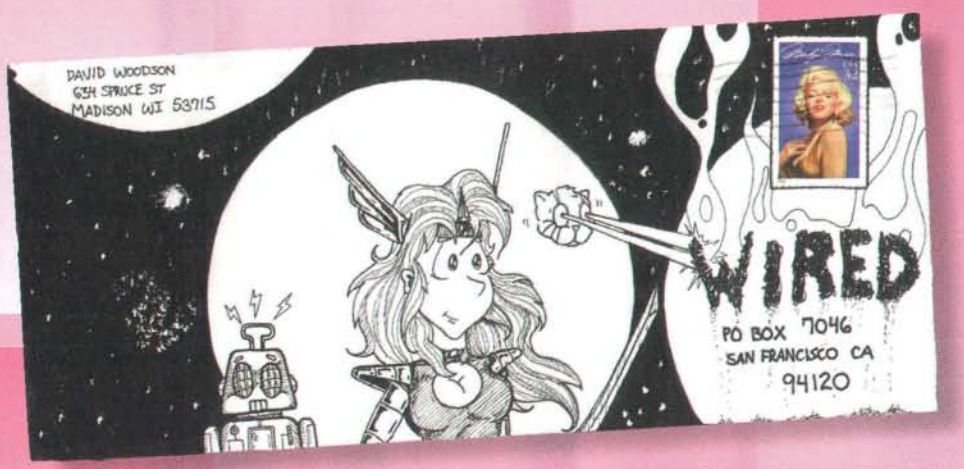
Just as Steve Jobs with his early idealistic, entrepreneurial spirit somewhat incorrectly proclaimed a social revolution when the personal computer penetrated households in the industrialized world, his proclamation that the Web is not going to be a "life-changing event for millions" is equally off the mark.

He underestimates the impact broadband networks will have on human behavior. For example, broadband services will foster telecommuting, which in turn will bring about fundamental shifts in transportation patterns. Videoconferencing will begin to replace jet travel. Automobile use will decline. Cars will last longer. And before you know it, the largest single factor in the GNP – the automobile industry – is impacted.

**William Troper**
**troper@shaysnet.com**




### Webonomic Analysis

I appreciate your writer's efforts to make some sense of advertising on the Web ("Advertising Webonomics 101," *Wired* 4.02, page 74). But I don't agree that "on the Web, everything we knew about advertising is out the window" or that "you must throw out all traditional thinking and start from scratch." If anything, it is the exact opposite, because on the Web and only on the Web can the promise of an integrated marketing campaign that is targetable, measurable, and accountable truly exist. The Web fulfills the promise that ad agencies have been making to their clients for years.

**Robert Kadar**
**rkadar@doubleclick.net**

I enjoyed the principles of advertising webonomics outlined by Evan I. Schwartz, but I was disappointed to read that he found the cost-per-thousand formula used in advertising to be "confusingly shortened to CPM." Perhaps with the millennium approaching, Schwartz will figure out what the Roman numeral M means.

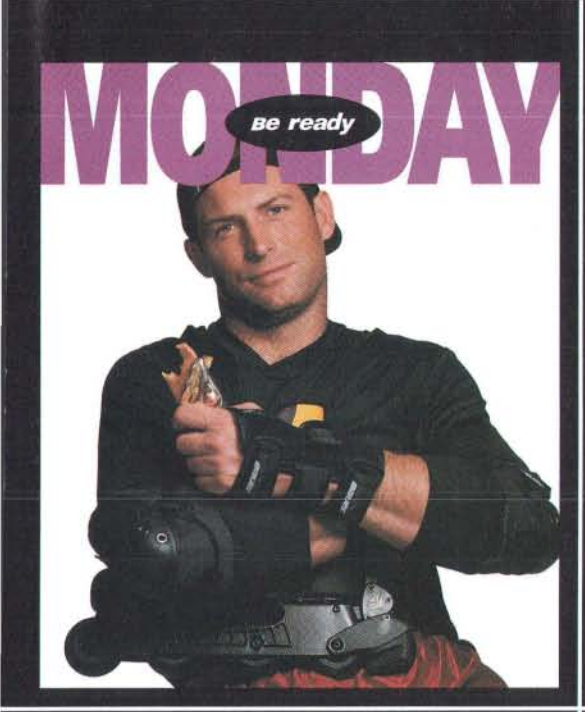
**Laszlo Domjan**
**ldomjan@home.stlnet.com**

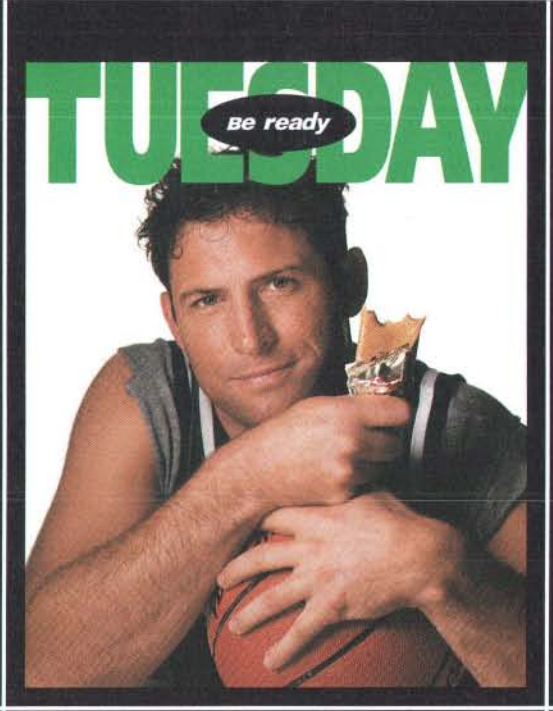
### On Scientology

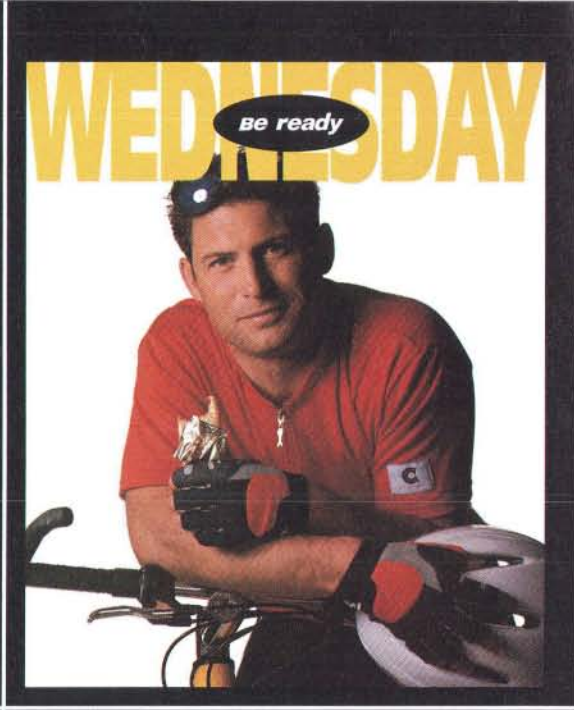
In protesting your December 1995 article on Scientology and the Internet, Leisa Goodman does a slick job on behalf of the Church of Scientology (Rants & Raves, *Wired* 4.03, page 32). She cogently argues the church's prerogative to hold the world at bay using the weapons of copyright and trade secret law – the only problem is she sounds more like the defender of a *Fortune* 500 company's interests than the spokesperson for a church. Then again, maybe that's the point.

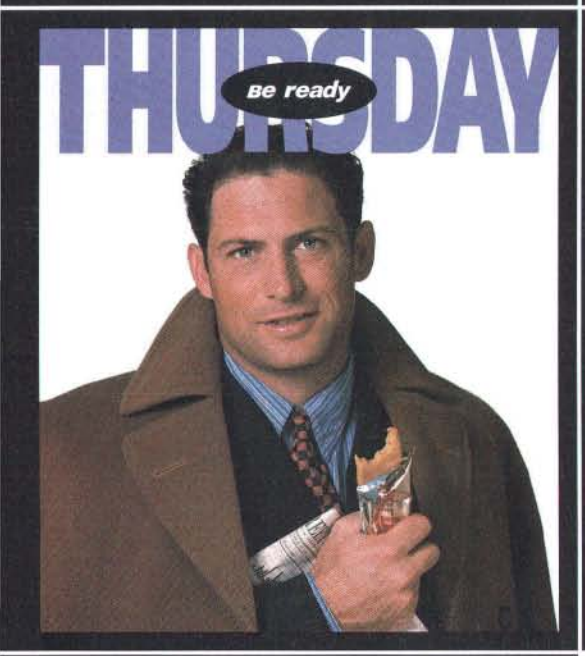
Most interesting to me is Ms. Goodman's admission that the Church of Scientology went to the trouble of obtaining the transcript of a 911 call resulting from an incident in which the church purportedly took no part whatsoever. Why bother? As for documenting a "long trail of lies" I have purportedly told, there is nothing of the sort to be gleaned from that transcript, and Ms. Goodman surely knows it. Specifically, Ms. Goodman's unsupportable assertions notwithstanding, *I* made the initial 911 call, and I never threatened anyone with a gun. Perhaps damage control à la Church of Scientology means deflecting attention from the church whenever the attention is uncomfortable, irrespective of the truth. Perhaps that is another lesson to be learned about Scientology.

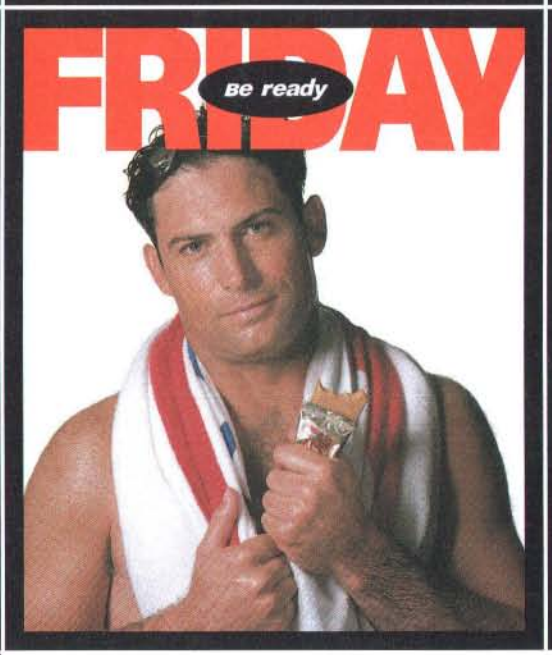
Finally, although Ms. Goodman claims the church's interest is rooted in its desire to preserve First Amendment rights, Scientology actually has

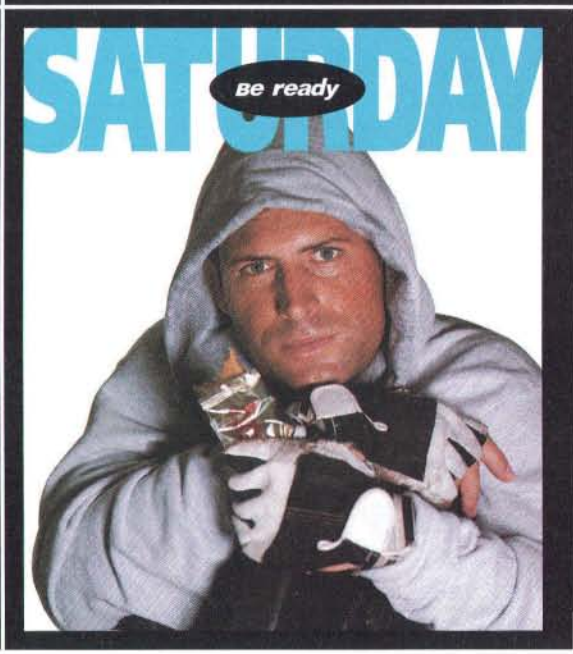


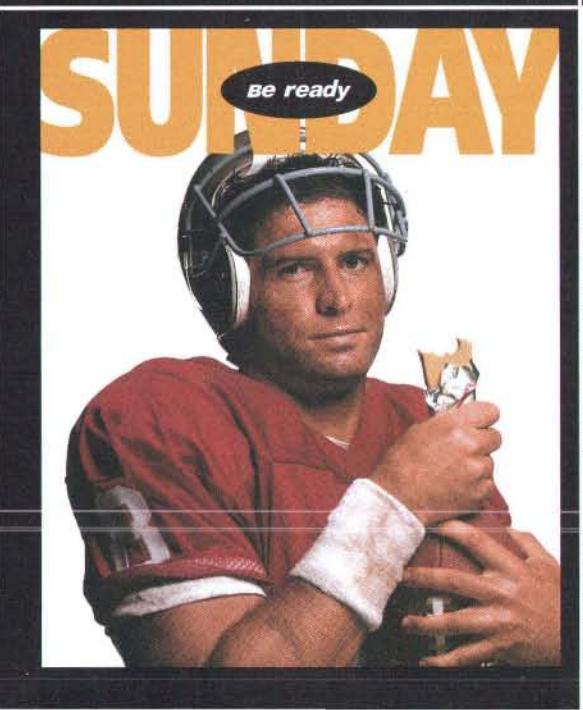

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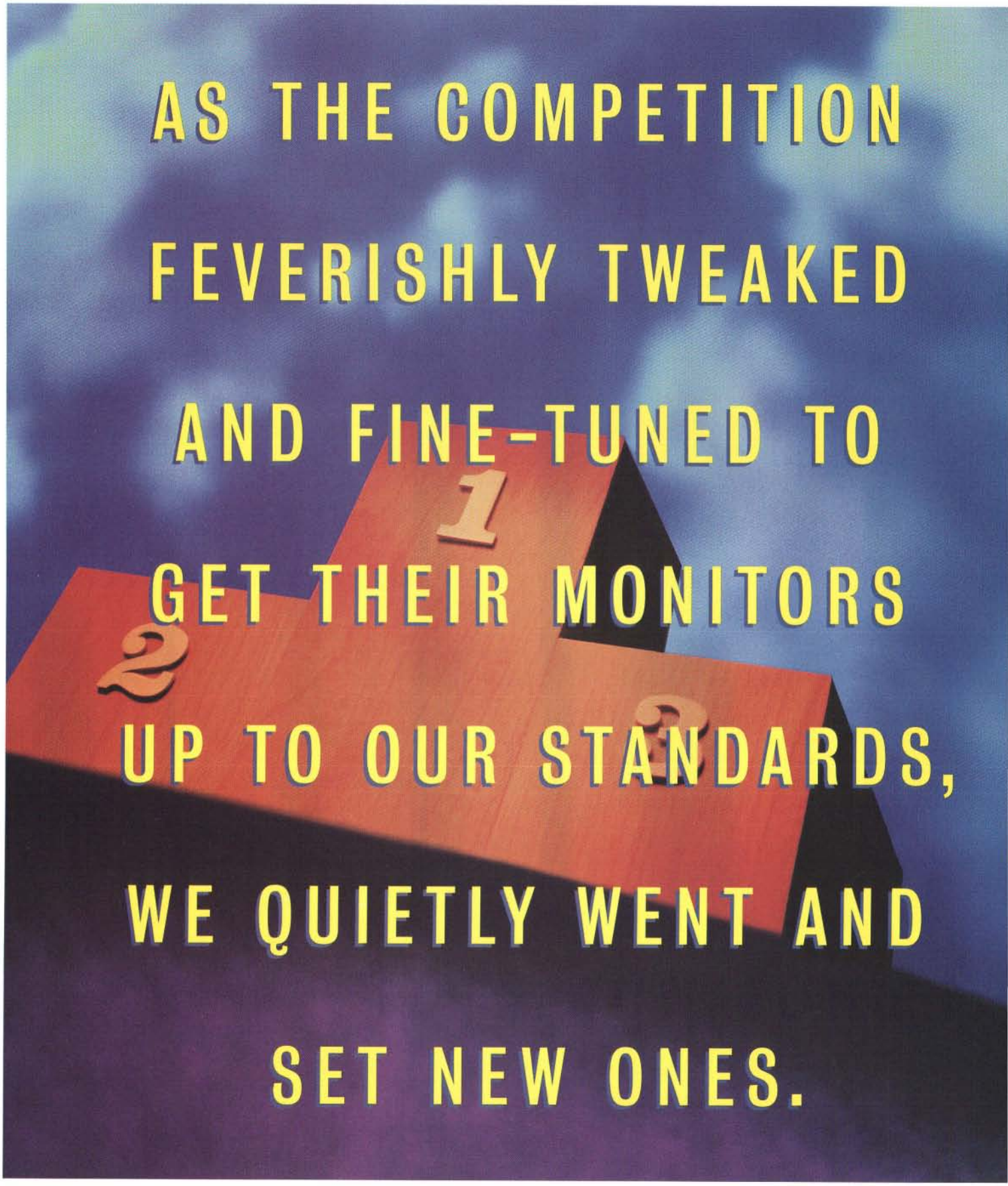


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a demonstrated practice of working to undermine the constitutional rights of those who get in its way. As a California appellate court recently noted in *Church of Scientology of California v. Wollersheim* (see *www.callaw.com/b084686.html*), the church has more than shown its willingness to "employ every means, regardless of merit, to frustrate or undermine" constitutional rights when it is being exercised by a Scientology antagonist.

It thus appears that Scientology has a transparent agenda that it seeks to further by use of slick rhetoric, and that glitches caused by critics are not to be tolerated. I consider the battle against the church's bullying to be noble.

**Tom Klemesrud**
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*The Rants & Raves section of* Wired*'s March 1996 issue included a letter from Leisa Goodman of the Church of Scientology mentioning a police report involving Tom Klemesrud.* Wired *does not vouch for or fact-check the truth of statements made in Rants & Raves, such as those in Goodman's letter and Klemesrud's response; the section is a forum for readers to express their opinions. We do attempt, however, to allow readers to respond to accusations, and we regret not having given Klemesrud a chance to respond to Goodman's letter in an earlier edition of the magazine. – The Editors*

### The "Benefits" of *Mortal Kombat*

Kids pump quarters into videogames without any thought of increasing their parallel processing abilities ("Video Baby," *Wired* 4.02, page 96), even if it is a side effect of extended play.

And for kids who do not happen to have their heads screwed on straight and have difficulty facing up to their problems, videogames can be a downward spiral. I'm not saying that every kid who tries his hand at *Street Fighter* or *Mortal Kombat* cannot face up to reality, but extended gameplay can be addictive and ultimately harmful to impressionable kids, causing short attention span syndrome, fiery tempers, a loss of normal everyday communication skills, and an inability to handle real situations, not to mention the effects of continuous play on one's social life. These effects may seem extreme – but then so is developing parallel processing abilities.

I have this advice for the author of the piece: Go ahead – play all the videogames you want. Just don't let them get to your head and invent "benefits."

**Quek Kon Hui**
**khquek@singnet.com.sg**

### d'Amn the DMV

I enjoyed Rogier van Bakel's "Manglemania" (*Wired* 4.02, page 98). Indeed, I am facing a similar problem: the dumb terminals (or dumb bureaucrats?) who don't like the apostrophe in my last name.

I moved to San Francisco in the early '80s. It was in the days when DMV employees still used the great IBM Selectric typewriters, and so it was fairly easy to get "Thierry d'Allant" on my drivers license, with a small *d*, an apostrophe, and a capital *A*.

Things got more complicated last year when I moved to New Jersey, where the DMV computers don't use apostrophes or lowercase letters. As a result, my last name is DALLANT, whether I like it or not. I don't.

Sometimes, I wonder if Senator Alfonse D'Amato is named DAMATO on his license.

**Thierry d'Allant**
**PlanetTdA@aol.com**

### The Silicon Valley of India

Your recent article "Bangalore" (*Wired* 4.02, page 110) was long overdue. However, as someone who worked in IT in Bangalore, I thought the piece ignored some crucial issues.

Bangalore's competitive advantage lies in its ability to deliver low-cost, high-quality software. But several critical factors are holding Bangalore back. The region lacks the modern telecommunications infrastructure necessary to compete in the global information economy, any credible or historic global marketing expertise, any significant venture capital participation, and a national over-the-counter stock market like Nasdaq. Not to mention the pervading ignorance and disregard of intellectual-property laws. Who can deny the role these things have played in the development of Silicon Valley or Route 128?

I am very positive about my hometown, and it will always remain India's "City of the Future." I look forward to the day when a Bangalore-based software company makes an IPO on Nasdaq.

**Thomas Kurian**
**gofax@ids.net**

### Brinning with Privacy

It was with great pleasure that I read the short interview with David Brin ("Privacy Is History – Get Over It," *Wired* 4.02, page 124). For too long now the intelligentsia of the digital age has been promulgating the doctrine I think of as "PUG" – Privacy, the Ultimate Good (maybe that should be God). Of course, ultimately privacy benefits only those with the power to enforce their own privacy and subvert the privacy of others. Power, especially the power of wealth, needs secrecy.

We like to talk about the new kinds of community that a wired world enables, but we tend to forget that real communities come about through the shared understanding that can arise only in the presence of shared knowledge – about ourselves, our work, our lives, our families. Humans evolved as a family-based and tribal species, founded in intimate knowledge about the lives of our neighbors. We still thrive on gossip, and yearn for emotional connections with others, but we are instructed by the purveyors of the "future" to do all we can to prevent our communities from knowing us in any ways but those we purposely present for public consumption.

As Brin points out, secrecy and freedom are opposites. We do not get more free by allowing our society to become more secretive. We do not make more effective communities by striving to make ever-stronger encryption available to everyone. And we do not make ourselves more secure by providing the tools of secrecy to those who would rob, harm, or oppress us.

**Ron Myhr**
**rmyhr@pathcom.com**

### Savior or Sellout

You were more than a little hard on the EFF ("How Good People Helped Make a Bad Law," *Wired* 4.02, page 132). It's fair to say that had the group not interceded, there still would have been a Digital Telephony Bill. But that bill would have been far more odious than the version that passed. Political purity may afford armchair theorists a clear conscience, but it has little influence on the world.

Kudos to John Perry Barlow, Jerry Berman, et alia for putting on their hip boots, stepping into the sausage factory, and working to do what they could to ameliorate the inevitable outcome.

**Heather Higgins**
**75322.3415@compuserve.com**

So the EFF is dead and ineffectual and an inside-the-Beltway sellout? Gosh, what was your first clue? Mine was Esther Dyson's preposterous interview with Newt Gingrich, as featured on your cover ("Friend and Foe," *Wired* 3.08, page 106).

**Jym Dyer**
**jym@igc.apc.org**

### Negroponte Lite

Trees died in vain to bring us Nicholas Negroponte's "The Future of the Book" (*Wired* 4.02, page 188). Read it again, carefully, and tell me if any of his insights are missing from this edited version:

*Books were invented in 1496 by a guy named Aldo in Venice. Things that looked a lot like books for centuries before that must have been something else.*

*People like to turn pages. Speech and writing use words.*

*Paper costs money, so books will be irrelevant in 25 years. But they are better than digital appliances. You can stand on a book, but not on a laptop.*

*Some guy at Nick's Media Lab wants to bind paper-thin electronic screens into the shape of a book and download words onto them. There is not yet a way to do this, but "this is the likely future of books."*

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*"Some of us in research are working really hard to make them feel good and be readable – something you can happily curl up with or take to the john."*

My books do this already. Nick, do you need a rest? Ask the nice people at *Wired* for some time off.

**Mike Gordon**
**mg@istudio.com**

### More Resistance

A. Lin Neumann's "The Resistance Network" (*Wired* 4.01, page 108) quotes Cornell University's Michael Koplinka as suggesting that Amnesty International is behind the curve in using the Internet for human rights activism.

Contrary to what Koplinka suggests, the incident he cites – the beating of Koigi wa Wamwere's lawyers on the courthouse steps in Nakuru – was the subject of an Amnesty news release on August 10, 1995, the day the incident happened.

Amnesty International has been using the Internet since 1987. We distribute full-text urgent actions to an extensive network of human rights activists via electronic mail on a daily basis. We also post partial-text urgent actions, news releases, and bulletins at various Internet sites. Amnesty also has an extensive World Wide Web presence; check out *www.amnesty.org/* or *www.gatech.edu/amnesty/international.html* for links to excellent sites worldwide.

**Morton Winston**
**Chair, Board of Directors**
**Amnesty International USA**
**mwinston@igc.apc.org**

### Not @Home

Nice article on cable modems ("The Race for More Bandwidth," *Wired* 4.01, page 140). As a piece of PR puff it was great; as a piece of intelligent, informed, skeptical journalism (which is what we expect from the educated cynics at *Wired*) it was sadly lacking. The very real problems with cable modems and with the cable companies trying to get into the ISP business were just ignored. As were the great alternatives.

You seem (surprisingly) generous about the ease that cable companies will have in actually offering these services. After 20 years' experience, my cable TV provider still has difficulty delivering analog broadcast. I get services I didn't order, the billing is wrong more often than it is right, and reliability is *atrocious*. Given this track record, it's hard to believe they'll find it easy to develop a new, complex network with switching and billing requirements.

More significantly, there are *huge* technological problems. @Home's network is designed for low-quality, one-way transmission of a fairly forgiving analog signal and not for the two-way transmission of sensitive data. It is arranged in a tree topology, which has serious problems. The first is contention – everyone in your neighborhood shares the same bus. That 10 Mbps is in common – if you assume only a 10 percent take rate and 500 homes, then each user only gets 200 Kbps, which is not much more than ISDN. The second problem is security – that shared bus allows everyone in the neighborhood to listen in on every transaction. Third, there are gross problems with noise ("ingress") on the coax plant. Not only is frequency band ideal for picking up AM radio stations, ham broadcast, and household noise, the tree topology guarantees that the noise from every location is carefully channeled back to the head end, where all the signals meet and the return path is weakest. These are not insurmountable problems, but neither are they trivial, and the article passed over them completely.

The biggest surprise, however, was the complete omission of DSL technology, which virtually all the telcos are planning for. ADSL is high-bandwidth (dedicated, not shared), uses existing telephone wiring, ties into the switching fabric and network, and is provided by companies that have a clue about customer service and networks. And the telcos have loads of cash to pay for it! If the 6 Mbps of ADSL isn't enough, then VDSL is being demo'd now – 51 Mbps to the home on existing copper.

ADSL gets a lot of grief for being asymmetrical, but it is offering hundreds of K of upstream. I never thought I would see the day *Wired* would praise a service with 14.4 Kbps upstream. Who needs interactivity or creativity if you can be a digital couch potato using the 14.4 to select a channel or press the Buy button? What is this – the Net reduced to the Home Shopping Network? Pathetic.

**Rupert Baines**
**rupes@cris.com**

### Women on the Cutting Edge

Just flicking through the December issue of *Wired*, getting all hot and cyberfeminist about the lack of XX-chromosomed individuals featured in your fabulous, international, did-it, done-it, doin'-it-tomorrow, edgier-than-anything journal. But after *really* close inspection, we catalogued, oh, at least a big handful of the aforementioned gracing your pages.

There were the two slightly useful hardbody clones holding up the TVCR in the Samsung ad. Then there was the special, special feature on Shimrit Elisar ("Girl Talk," page 45). She hates men, so we decided that she must be a feminist. We really liked the article on Maja Matarić, though the title, "Fast, Cheap, and Very Polite" (page 49), was just a wee bit telling, and terribly prefeminist. The Airwalk waif (page 51) is definitely a spunk, and we'd kill for the dress and the shoes, proffered with such a pleasing air of servitude. It's reassuring to know that cherry-blossomed compliance is still with us tomorrow. GTE Interactive Media's Marilyn ("The New Hollywood: Silicon Stars," page 142) looked like a pretty good grid to us ... a 36-24-36 number-crunching template of Future Woman?! Then – bonus! On pages 144 and 145, a spread of Hot Hollywood Honchos! And all female! We knew that you couldn't get anywhere without a beard in this town!

Now look here: We've been working in digital media for the past 10 years. We know there are a lot of big-brained codechicks using, innovating, creating, and subverting technologies. If you haven't come across them, then maybe you need new researchers.

**t0xicHoney and Gash Girl**
**barratt@cleo.murdoch.edu.au**
**gashgirl@sysx.apana.org.au**

### This Is Not a Love Song

A while ago, I enjoyed reading *Wired*'s favorable review of my novel, *Virtual Love* ("Shrinks in Love," *Wired* 2.09, page 133). That's my rave.

My rant? *Wired*'s recent chart/article "Is It Art, Or Is It Appropriation?" (*Wired* 3.12, page 78) compared *Virtual Love* with the work of your contributing editor, Paulina Borsook, and implied that one of us appropriated material from the other.

I thought the chart was bizarre, inaccurate, outrageous, and damaging. Whoever dreamed up the far-fetched comparisons ought to have his or her virtual head examined. I can only swear on everything I hold sacred that I never knew of, heard about, read, or had any contact in any form, including the digital and occult, with your editor's titles, typescripts, or other pages during the creation of my novel.

**Avodah Offit**
**virtualove@aol.com**

### Undo

▪ Spin Cycle: We twisted the numbers for ordering the book *Inside the Tornado* ("Tech Marketing 201," *Wired* 4.03, page 166). For a single copy, call (800) 337 3761; call +1 (212) 207 7887 to order more than 25. ▪ Any Port in a Storm: The Ditto Easy 800 (Fetish, *Wired* 4.02, page 55) doesn't connect to the parallel port of your Mac. A Mac doesn't have a parallel port. ▪ Spies at the Pearly Gate: To the best of our knowledge, the late Max Thurman no longer sits on the Science Applications International Corp. board of directors ("Spies at the Gate," *Wired* 4.02, page 72). ▪ CorrexOn: The comical program HexOn Exon (Electric Word, *Wired* 3.12, page 44) was created by Robert Carr *(smurfboy@aol.com)* and is only available for the Mac.

Send your Rants & Raves to:
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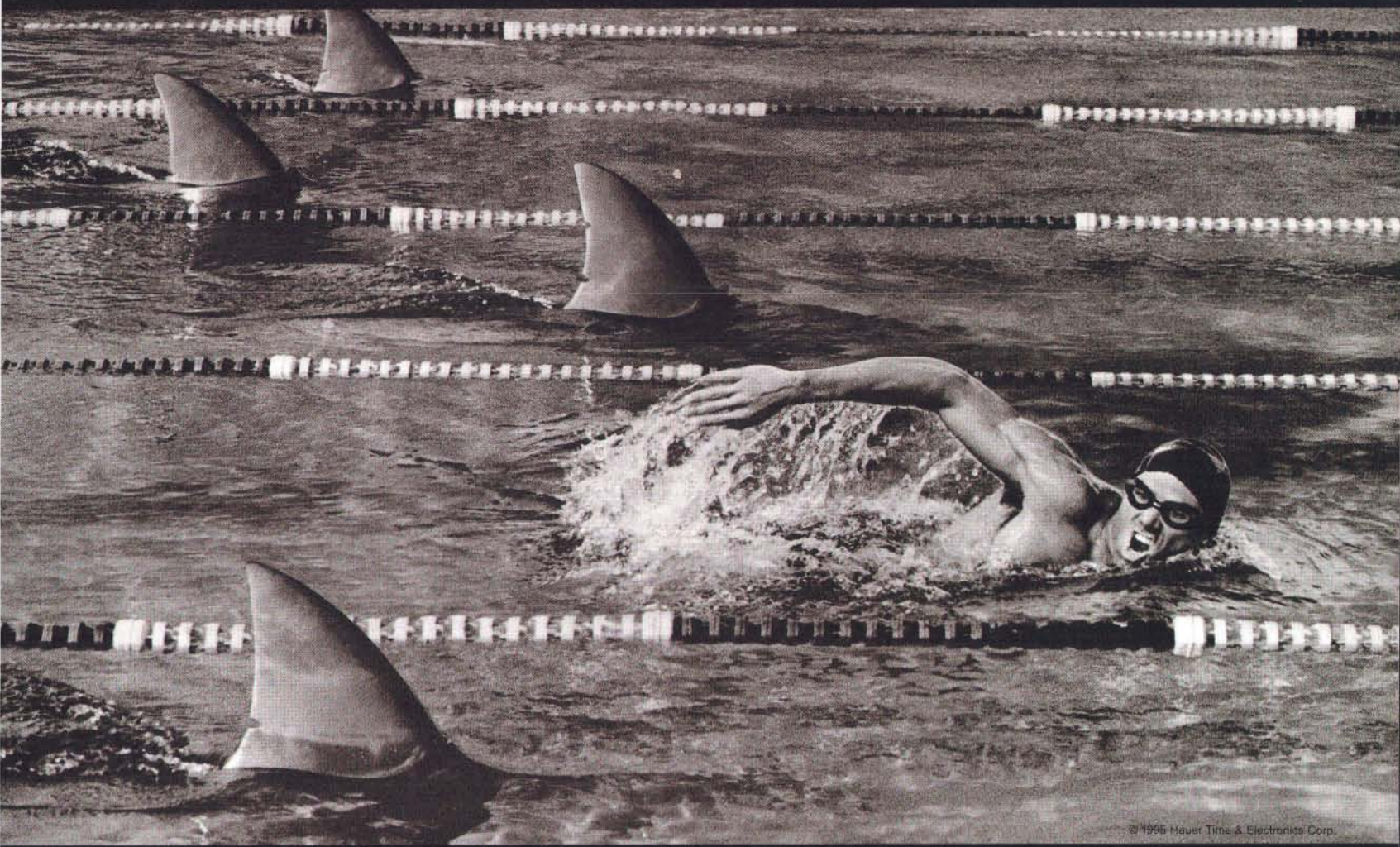

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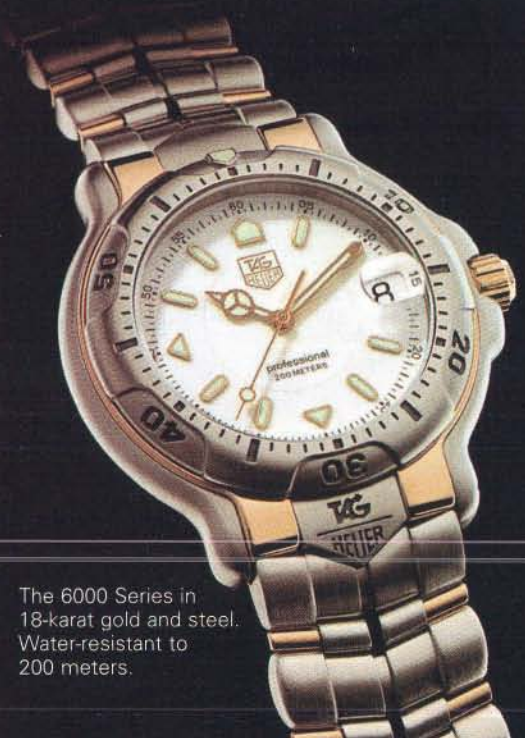
# GAME.



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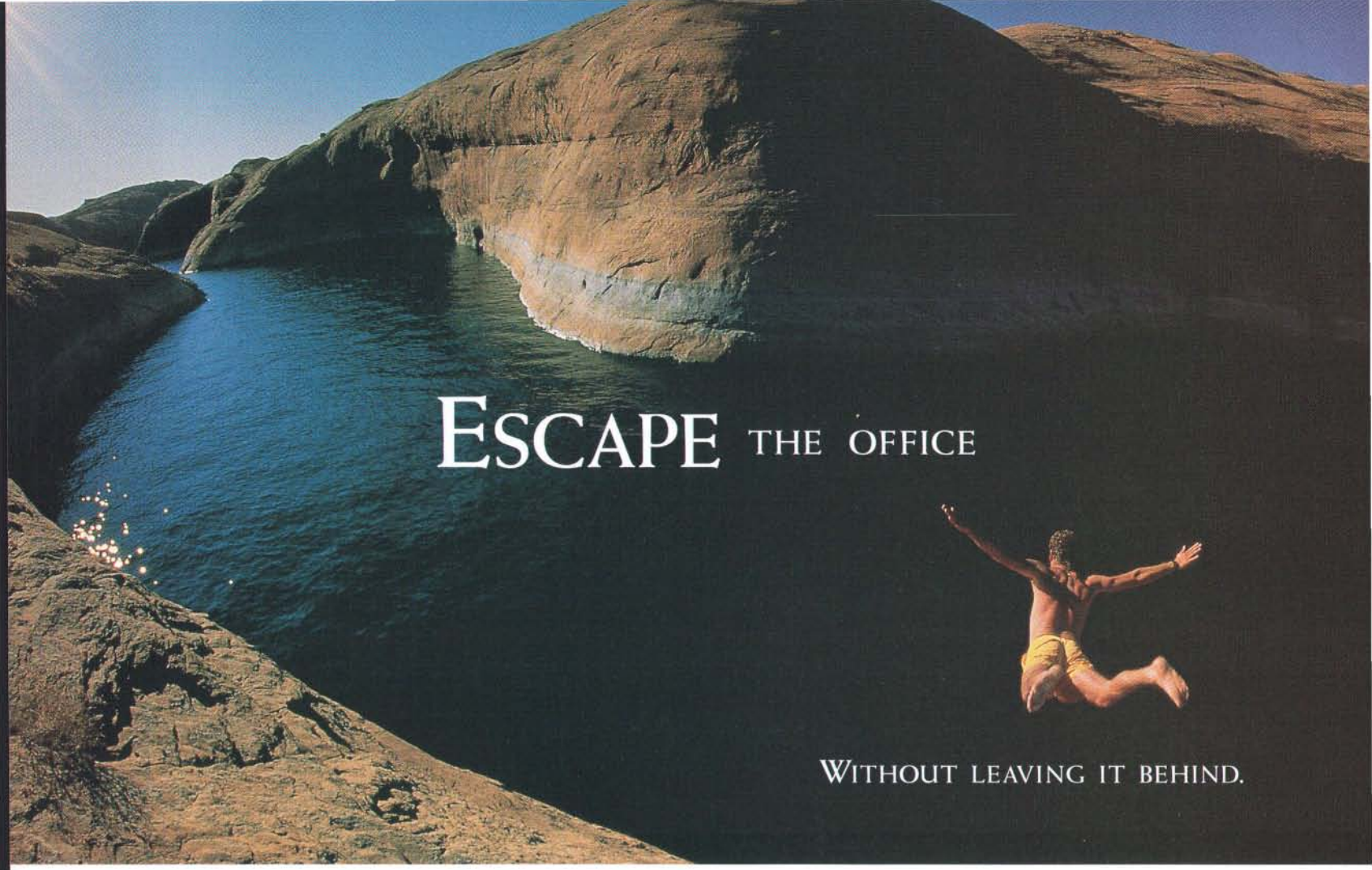


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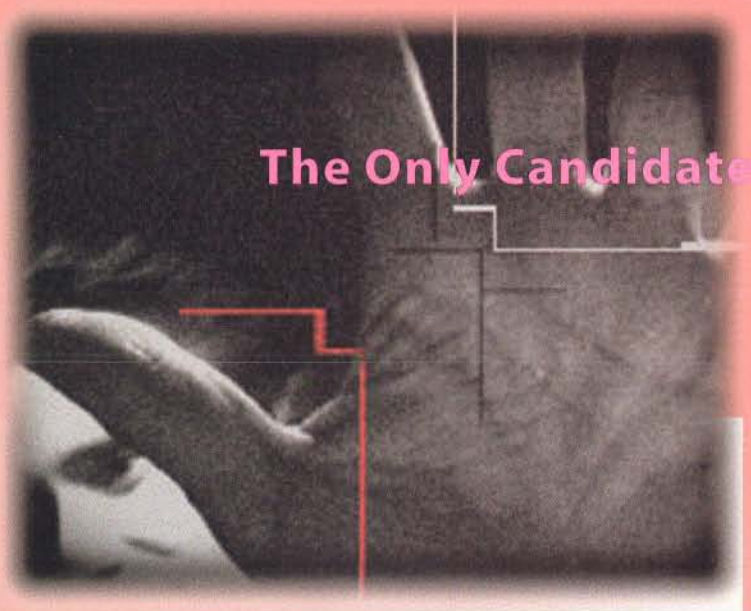


## The Only Candidate that Matters is Virtual

**Jack Parrish is a 38-year-old charismatic entrepreneur who made his fortune in the software business. He didn't intend to run for president of the United States, but when undergrad Spike Mason organized a Web-based grassroots movement to draft Parrish, the Republican got 3 percent of the vote as a write-in for the New Hampshire primary. Now his candidacy is rapidly gaining support.**

**The good news? In Mason's word's, Parrish wants to "keep the Net free and public, and retool the school system from a crusty, old, manufacturing economy to an educational system that works for a new economy."**

**The bad news? Parrish isn't real. He's a character in *Candidate 96*, a Web show at *www.candidate96.com/*. Just try not to get depressed when you remember who's really running for president. – *Mark Frauenfelder***

# ELECTRICWORD

## AT&T Delivers Net Access

In late February, AT&T announced that its upcoming WorldNet Service would provide five free hours of Internet access a month to all AT&T residential long-distance customers. At once, the company's lines were swamped by callers eager to sign up, and with an estimated 25 million AT&T customers owning PCs, it's hard to bet against the company's latest foray into the online world.

That was certainly the stock market's perception: major access providers from America Online to Netcom saw their stock prices drop on the announcement. With the regional Bell companies, long-distance providers, and cable companies working on their own competitive offerings, expect to see new definitions of the word "free" cropping up regularly.

AT&T has stormed into existing markets before – go back to the launch of its Universal Card, when AT&T gave customers no-fee credit cards for life and changed the credit business forever. ISPs, brace yourselves for the communications giant's next tsunami. – *Andrew Anker*

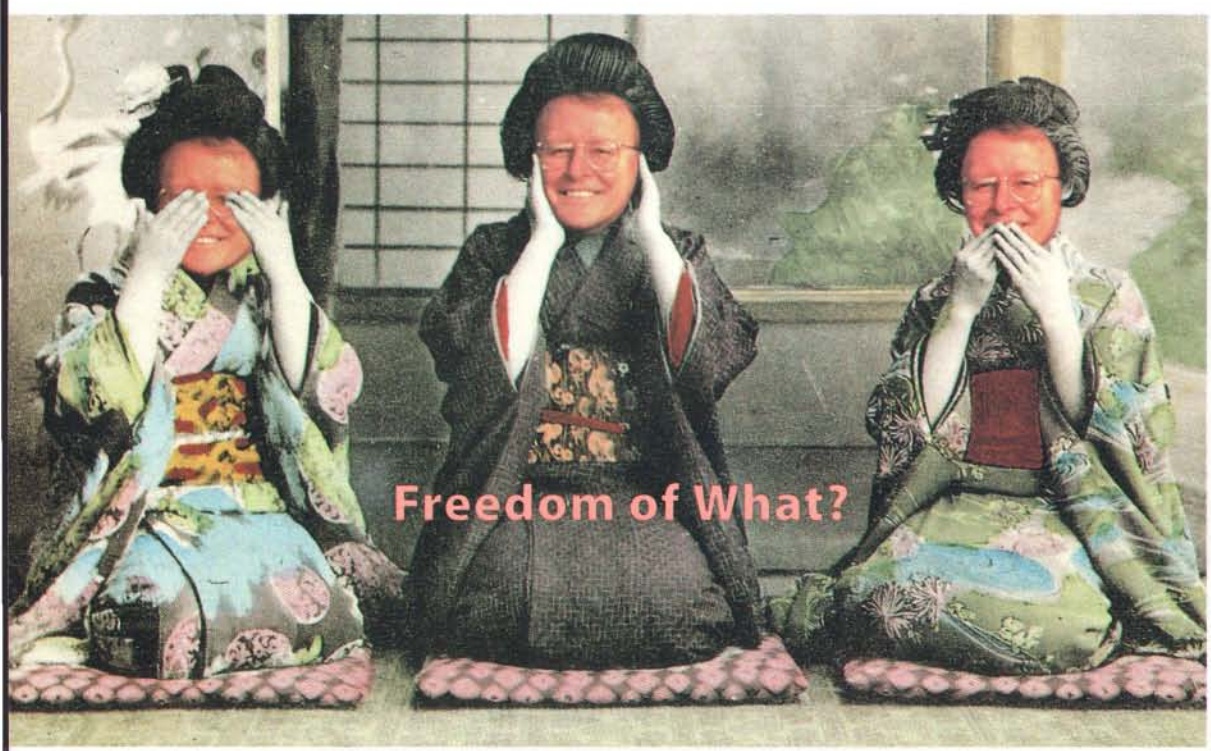
PHOTO BELOW: MIKE VALERI/FPG INTERNATIONAL

## Grab for the Net Proceeds

While the federal government is trying to figure out what hit it after rubber-stamping the shit-stupid CDA, state and local officials are also discovering netizens' resistance to bureaucratic intervention. On January 16, city council members in Spokane, Washington, proposed a 6 percent telecommunications tax for Internet service providers. Pissed-off users created protest sites on the Web and spammed officials with email and phone calls. The stunned council backed off, but promised – Terminator style – that they'd be back.

They'll have to get in line behind Uncle Sam, who will soon be holding out his broad palm next to your modem. Ever since the Internet became a free long-distance telephone network, the telcos have been wondering out loud why they have had to pay a federal tax and the ISPs have not. The free ride is over. – *Mark Frauenfelder*

**☰Ill Stop Regulating Me, Regulate Them: Here's a good one. The America's Carriers Telecommunication Association, a trade organization representing long-distance carriers, has filed a petition asking the FCC to block the sale of Iphone-like devices. Yup, those same long-distance companies that wanted the FCC abolished are now asking that it protect them from the Iphone, which, you'll remember (see *Wired* 3.10, page 140), is a neat device that lets you talk in full duplex – albeit with some irritating glitches – across the Internet. The phone companies ignored these pesky devices for about a year, but now they're fighting for their industrial-age economic life. Check out their justification from a press release this spring: "ACTA submits that it is incumbent upon the FCC to exercise jurisdiction over the use of the Internet for unregulated interstate and international telecommunications services. Long-distance and international carriers must be approved by the FCC to operate and must file tariffs before both the FCC and state public service commissions." And why should the FCC be given this ►**



## Freedom of What?

Ask Netscape chair Jim Clark his position on Internet censorship and his reply may vary depending on what hemisphere he's in. Clark mentioned freedom of the press at a Hong Kong news conference during his tour of Southeast Asia in February. "It's in my Constitution in the US," he said. "I don't know if I have an opinion regarding legislation outside the US."

Clark visited five countries on his trip, seeking a regional office site. By 1998, Netscape expects Asian sales to account for up to 25 percent of its revenue – a prodigious estimate that may have downgraded Clark's scruples. When asked if a state-controlled Internet were feasible, he told reporters: "Look at our company. We have firewalls built internally that won't let you access things – say, *playboy.com*."

Despite Clark's waffling, Netscape's international marketing director Danny Shader says the company has no plans to modify its browser to appease the Chinese government. "Besides," he said, "we sell software, not content." – *Michael Behar*

PHOTO ABOVE: MOVIE STILL ARCHIVES; ORIGINAL PHOTO BELOW: ARCHIVE PHOTOS; CLARK PHOTO: COURTESY NETSCAPE

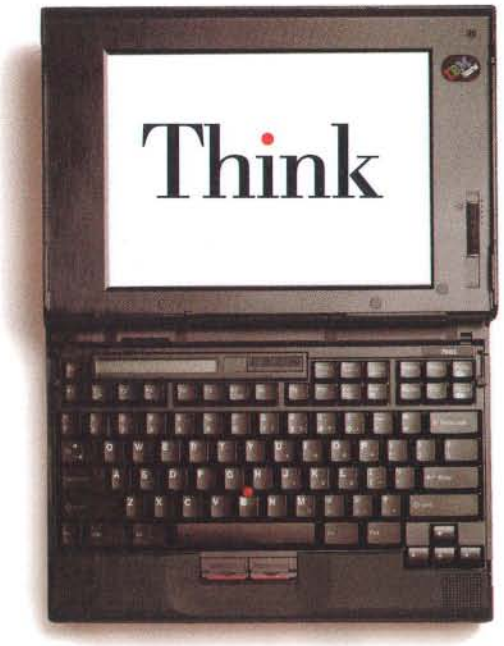
## The Mutatest Show on Earth

New York-based multimedia artist M. R. Petit describes her CD-ROM, *The Mutant Gene & Tainted Kool-Aid Sideshow*, as "the psychodramatic confession of an extraterrestrial." Taken more literally, the disc is an unsettling journey filled with sinister toys, grotesque creatures in gargoyle-like masks, and the fleeting images of half-remembered dreams, all set to a creepy, just-off-the-midway soundtrack.

Petit is now using the Web to create her next project. "I'm attracted to working on the Web because you can update things. A CD-ROM gets permanently pressed and you can't change anything." And for an artist, letting your creation mutate is half the fun.

– *Mary Elizabeth Williams*

PHOTO: JILL GREENBERG

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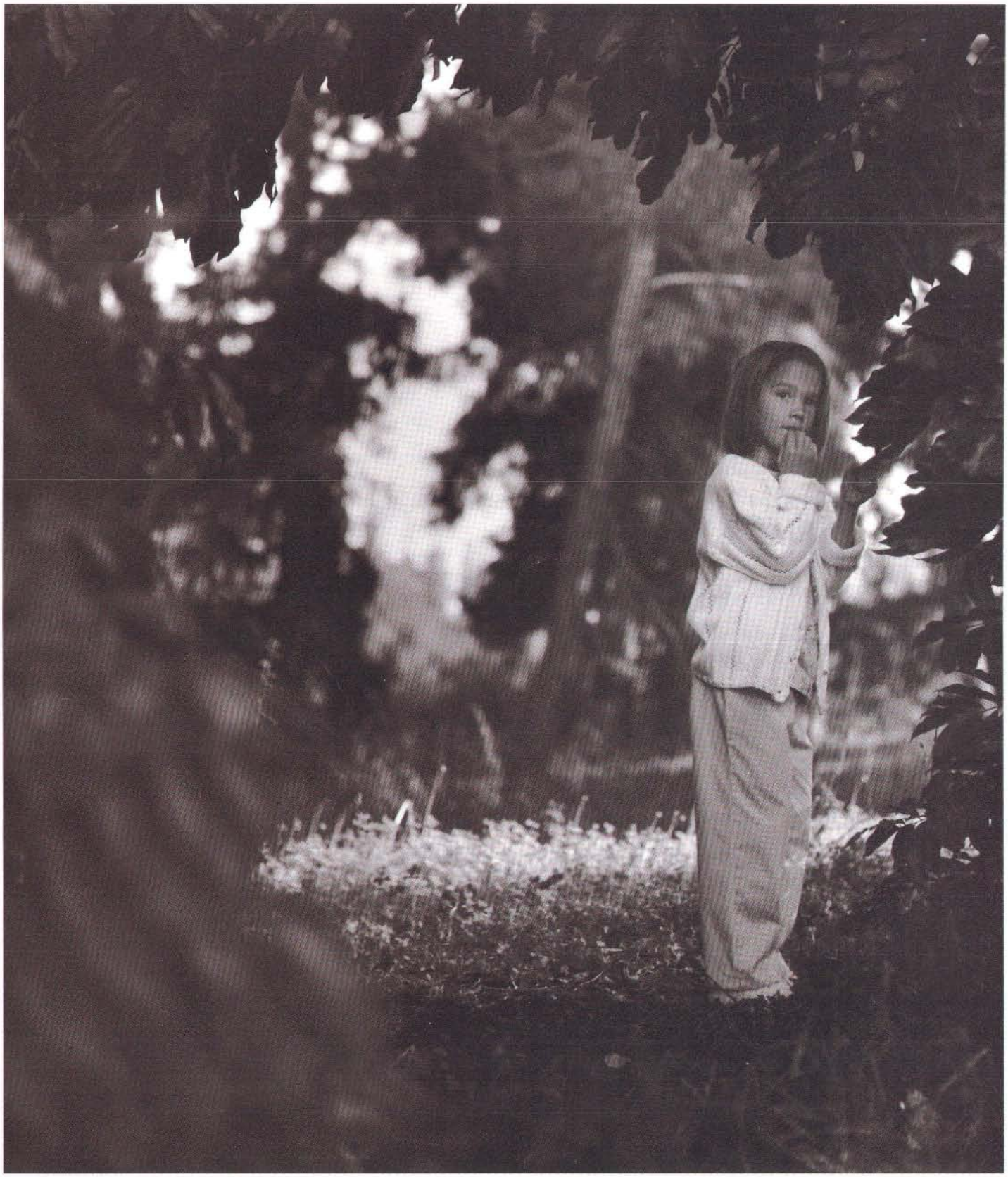


#4723

## Ground Zero

**Canadian video artist/entrepreneur Stephen Marshall is creating "an alternative universe to television" – an advertising-free, global forum for independent content. His quarterly video zine, *Channel Zero*, will bypass the broadcast system entirely and be distributed via newsstands, retail outlets, and soon the Web *(www.channel-zero.com/)*. Stylistically, it's an unlikely mix of *60 Minutes*, Negativland, and MTV – what Marshall calls "applying the MTV culture to an intellectual basis." He's betting *Channel Zero*'s mix of media criticism, grassroots reporting, and high-tech funk will win a global audience and perhaps inspire a new generation of video activists. "Television," he says, "is a palette that hasn't even been touched."**
***– Stuart Mangrum***

► new set of teeth? Because "the misuse of the Internet as a way to 'by-pass' the traditional means of obtaining long-distance service could result in a significant reduction of the Internet's ability to transport its ever enlarging amount of data traffic." Yeah, right. Take the last part of that sentence, change "Internet" to "AT&T, MCI, and Sprint," "transport" to "extort," and "data traffic" to "profit," and you have something closer to the truth.

≡III Made for TV: Remember Bill's ongoing and somewhat querulous courtship of the Chinese computer market? Last year Gates locked horns with the government over whether China would adopt Windows 95 as the state-sanctioned OS. (Seems like a good match to us.) This year Bill's got a different strategy: mass propaganda dressed up as edutainment. Microsoft and Compaq have joined forces to sponsor *My Computer Family*. Appearing weekly across the country on a new state-sanctioned "educational" channel, the half-hour

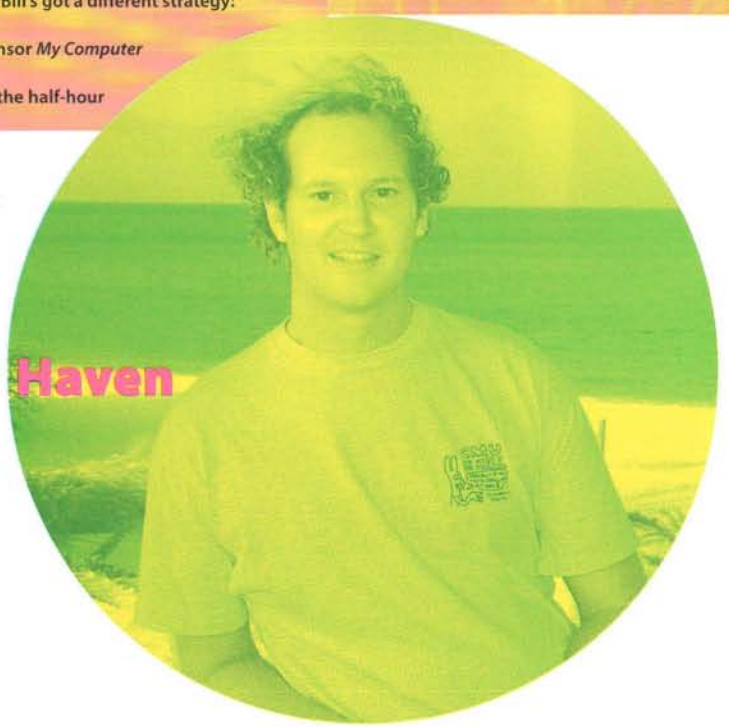


IMAGE ABOVE: KIM STRINGFELLOW

## Offshore Data Haven

A little more than a year ago, Vincent Cate left his studies at Carnegie Mellon University – where he was just a thesis short of a PhD in computer science – and moved to the Caribbean island of Anguilla.

With his technical background and libertarian-objectivist leanings, Cate didn't take long to come up with an attractive business plan: run Internet-based corporations and provide offshore accounts for US$50 a month to people who want to sell products and services over the Internet, while taking advantage of Anguilla's tax-haven status. "A company that is doing business over the Internet can be based anywhere, so why not somewhere without taxes?" he asks rhetorically.

So far, Cate's company, Offshore Information Services Ltd., only claims a few customers, but he reports that he's now seeing mounting interest from Americans concerned with effects of the Communications Decency Act. "Thanks to Anguilla's strict secrecy laws, we can offer 100 percent privacy-protected access," he boasts. For more information, see *online .offshore.com.ai/*. *– Steve G. Steinberg*

| TIRED | WIRED |
|---|---|
| MTV | *American Bandstand* reruns |
| Jim Clark in China | Bill Gates on free speech |
| Encrypted dirty pictures | Images with embedded digital codes |
| Cisco | NetStar |
| NSA sniffer bait in your .sig file (e.g., "assassinate") | CDA bait in your .sig file (e.g., "kiddie porn") |
| Porn starlets | Former porn starlets |
| Area 51 | H.A.A.R.P. |
| Cheap Internet access | Free Internet access |
| Guns | Atlatls |
| Hating your cable provider | Hating your Internet provider |
| Booze bars | Oxygen bars |
| Political attack ads | Political attack pollsters |
| Personal Web page | Personal Web server |
| Beatles anthologies | 20th anniversary of *Star Wars* |
| Boomers turning 50 | Boomers rediscovering marijuana |
| *Village Voice* | *NY Press* |
| Janet Reno | Edzard Schmidt-Jortzig |

## Line of Sight

At this year's NHL All-Star Game, Fox Sports debuted a hockey puck that leaves a bright trail for TV viewers. A chip in the puck transmits a signal to location sensors lining the rink. SGI computers in Fox's Puck Truck synch the live footage to the puck, giving it a colored comet tail.

"We can now superimpose graphics over real video in real time," says Stan Honey, a VP of technology at News Corp. In other words, anything that moves – from sports objects to people – is going to get a chip crammed into it and a video map overlay. Next up, golf and skiing coverage. – *Jesse Freund*

sitcom is about a man who goes to the US, buys a computer, and brings it back. Microsoft sees the show – which aired five straight nights in March during the launch of Windows 95 in China – as a pure marketing play, a chance to build brand awareness and subtly teach China The Microsoft Way. Each thrilling episode will focus on how the family learns to use Microsoft's spreadsheets, word processors, or games. According to a Microsoft spokesperson, a big theme throughout will be the protection of and respect for intellectual property. "China will be a big market for us eventually," he said. "Part of that is educating people about computers. But more important than that is educating people about what intellectual property rights are." We look forward to the ►

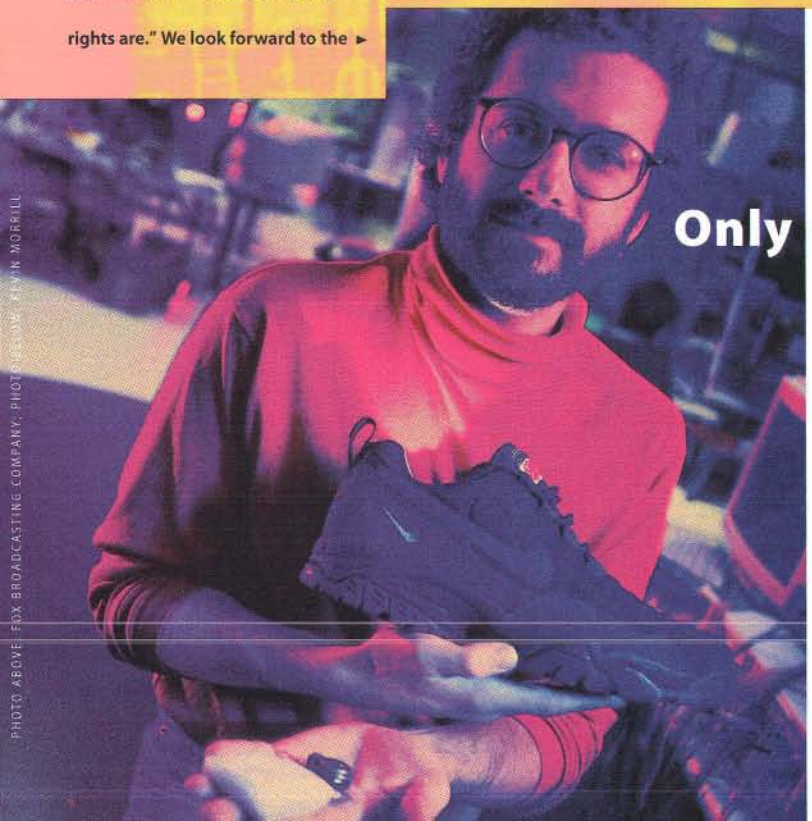


PHOTO ABOVE: FOX BROADCASTING COMPANY. PHOTOGRAPHER: KEVIN MORRILL

## Only Connect

**Networking at the next office shindig will take on new meaning once you get a pair of smart shoes. Last October at the MIT Media Lab's 10th anniversary party, Tom Zimmerman, inventor of the dataglove, and Professor Neil Gershenfeld demonstrated that a handshake can exchange business cards between shoe computers (see "Wearable Computing," *Wired* 3.12, page 256). The inventors use a technique that sends harmless, low-level electrical signals through the body, turning it into a network. The shoes act as processors for the network and are partly powered by the energy you create when you walk.**

**"With our intra-body signaling mechanism, you can use your whole body to do I/O," says Gershenfeld. A caveat: if you get tipsy at a party, don't exchange data with just anyone – you never know who's carrying a virus program as their calling card. – *Bob Parks***

# Three Up, Three Down

The third old-media mogul to venture into the brave new online world is following the path of her predecessors: Anthea Disney (right) has abandoned *iGuide*, the News Corp./MCI joint venture, to head up New Corp.'s HarperCollins book division. First it was Rochelle Udell, who left Condé Naste's *CondeNet* to edit *Self* magazine. Then Walter Isaacson departed from Time's New Media group (including *Pathfinder*) to become managing editor of *Time* magazine.

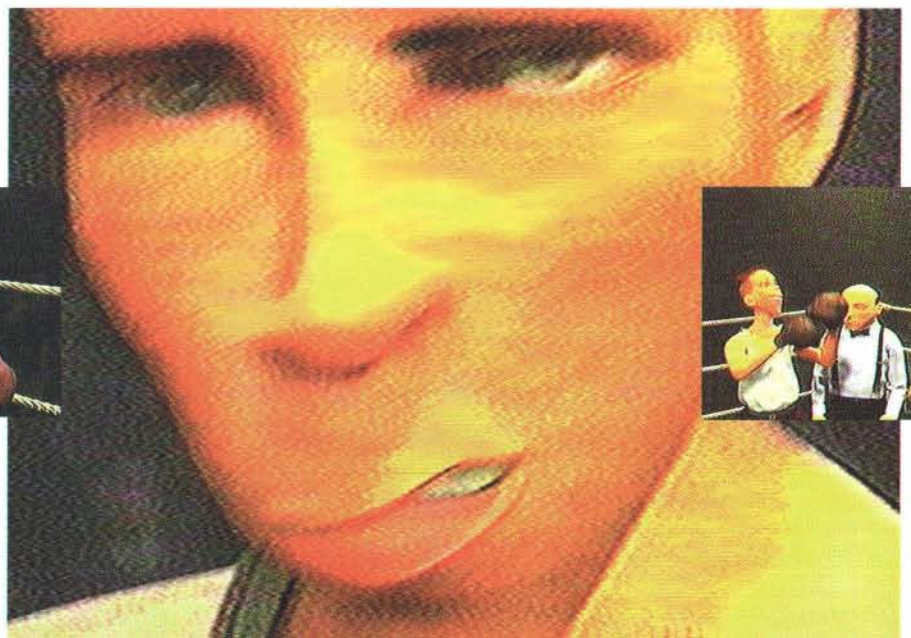
The optimistic view is that the old-media moguls saw opportunities they couldn't pass up. More likely, the dismal performance of their respective Web sites made them realize they were part of the road, not the steamroller. Both *Pathfinder* and *CondeNet* have seen significant turmoil since their leaders' departure. All eyes are now on *iGuide*. – *Anders Lund*

► episode in which the teenage son hacks around Chinese Net access restrictions, reads alt.democracy, and is thrown into prison for life as an enemy of the state (insert laugh track here). ☰III Japan Inc., Round Two: Will someone please put the nationalistic alliance concept out of its misery? Determined to regain the microchip crown and confident that collusion is the best route, the Japanese alliancemeisters are at it again, this time cooking up a new company called Advanced Semiconductor Technologies Inc., a partnership of Fujitsu, NEC, Sanyo, Sony, and just about every other chipmaker in the phone book. Imagine getting all those multinationals to sit together in one room and play nice. Good luck. ☰III It's the Thought That Counts: The latest, greatest twist on "How to Make Money Fast on the Web" comes from magazine start-up guru David Bunnell. Instead of paying the best minds for their contributions to their high-thought-content Web site *content.com*, Bunnell and partner John Brockman want the best minds to pay *them*. We'll let you know if it pans out. ☰III

# To Infinity and Beyond

Sure, *Toy Story* was the first feature film to boast a computer-generated cast. But what's the next step in the chain of digital evolution? According to Montreal-based TFX Animation Inc., it's *The Boxer*, an animated short that features the most photo-realistic humans ever to emerge from a hard drive. The pugilistic pic is particularly notable for characters' flowing hair and garments.

Company president Pierre Lachapelle said the convincing choreography comes courtesy of live actors hooked up to motion-capture gear. Parent company Taarna Studios Inc. has spun off a subsidiary, Digits 'n Arts Software Inc., to market the proprietary software used to create *The Boxer*. First up: Flesh, a US$10,000 3-D paint program. – *Paula Parisi*



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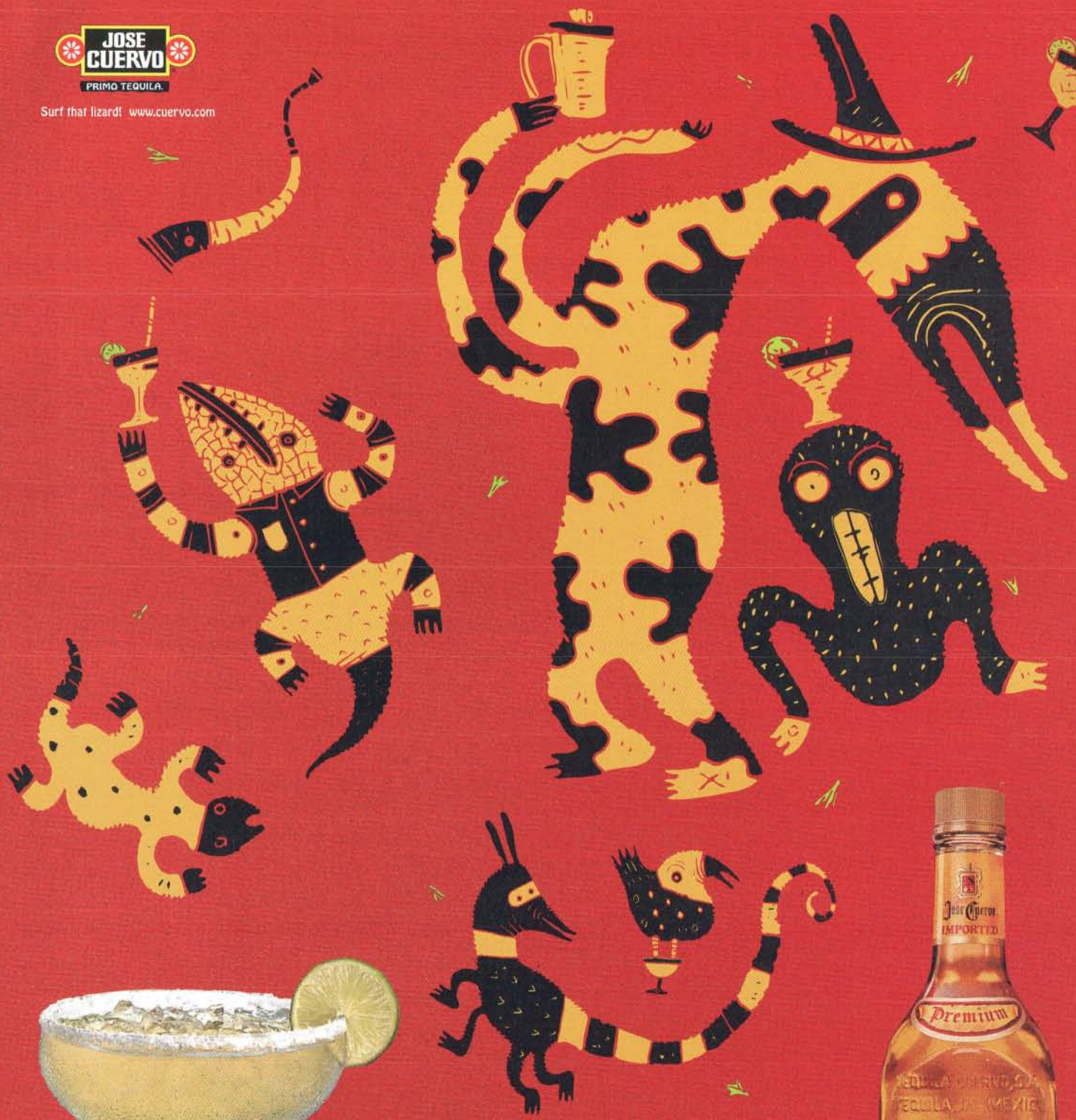

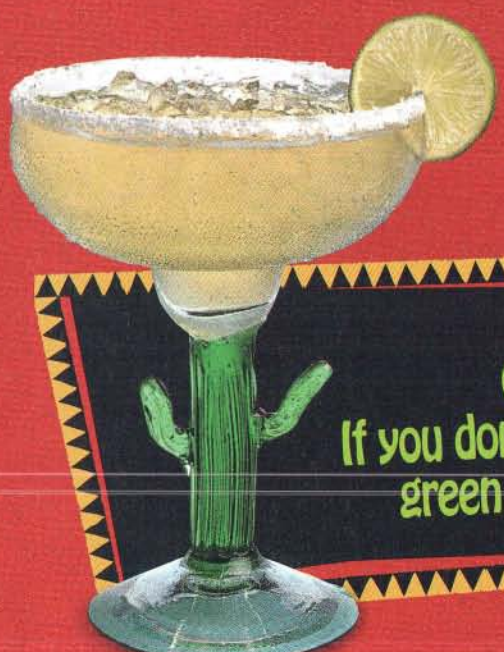

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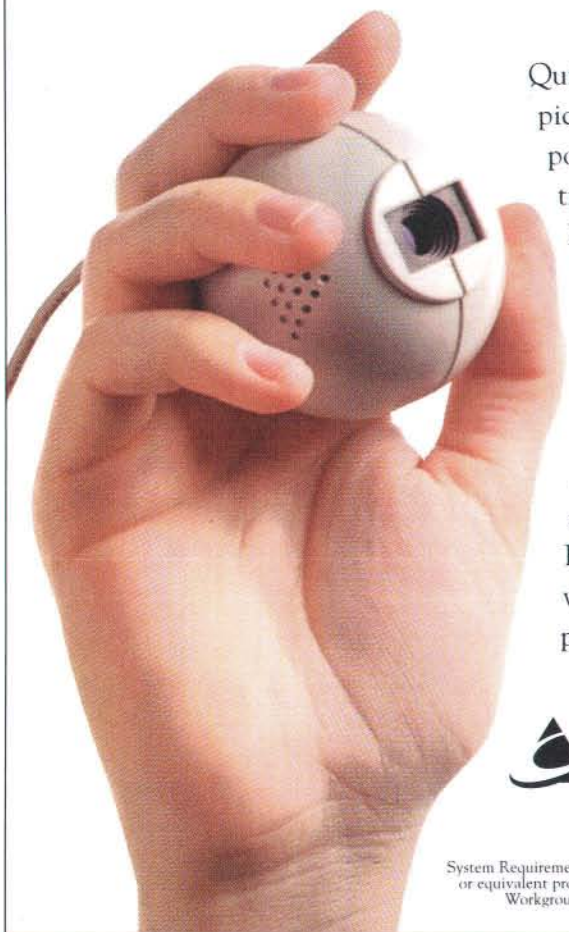

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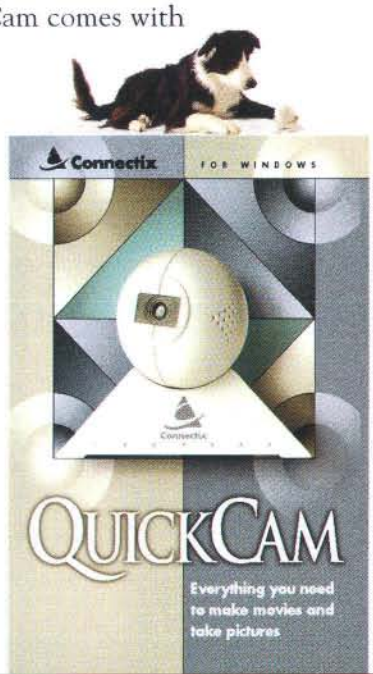


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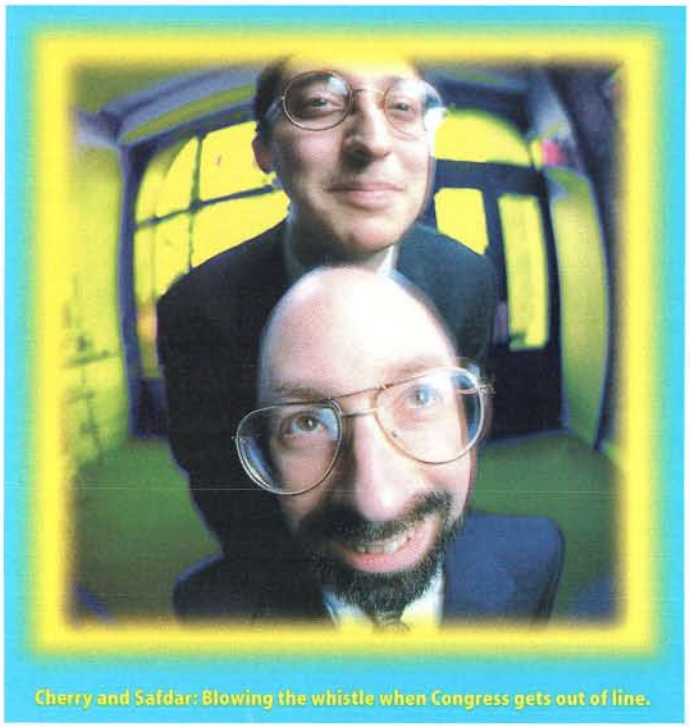
## Town Criers for the Net

"Another beer, please," Shabbir J. Safdar told a waitress on a bitter-cold Manhattan evening in late January. "It's gonna be a bad day tomorrow."

And so it was. Less than 24 hours later, on February 1, 1996, Congress voted overwhelmingly to pass a telecommunications reform bill containing the infamous Communications Decency Act – Net censorship legislation that activist Safdar had been waging war against for nearly a year.



Cherry and Safdar: Blowing the whistle when Congress gets out of line.

A computer programmer by day, Safdar spends the remainder of his waking hours as half of the two-man crew behind Voters Telecommunications Watch, or VTW, a Net-based, grassroots political-action project that has kicked up some of the most visible dust surrounding the Communications Decency Act and other legislation threatening online civil liberties. Computer journalist Steven Cherry constitutes VTW's other half, and on that bleak Thursday he was no more thrilled than Safdar about the situation.

But if the two of them were feeling defeated, neither was showing it. Powered by Safdar's hackerish obsessiveness and Cherry's low-key professionalism, VTW has made its mark selling wired voters on the notion that their voices do count in Washington. By churning out a steady stream of email updates on congressional activity – with periodic alerts on who to contact to sway critical votes – Safdar and Cherry have made participation in the legislative process a reality for the first time in many netizens' lives.

Of course, given the dismal understanding of online reality that pervades life on Capitol Hill, Safdar and Cherry often must satisfy themselves with tactical victories – a House member's consciousness raised by constituents here, an enlightened but ultimately doomed amendment nudged onto the floor there.

Nevertheless, VTW has also pulled off some dramatic coups, such as its now-famous Paint the Web Black campaign. Fanned by an eleventh-hour VTW email blitz, the campaign urged Web authors to turn their pages black the moment President Clinton signed the telecom bill into law on February 8. During the 48-hour mourning period, thousands of pages went dark in protest, and CNN, *Time* magazine, *The New York Times*, and other media heavyweights took note of the demonstration.

"If we did this for five years and made a difference in just one vote," Safdar says, "that's all I'd need to confirm my faith in the fact that democracy is actually working."

In the meantime, he adds, trading grins with Cherry, "If you can't win, you can at least be a big pain in the ass. And we're among the worst pains in the asses we know." – *Julian Dibbell*

**VTW has made its mark selling Net users on the notion that their voices count in Washington.**

mr. media

### Heeeee's ... Mr. Media!

Oy, so much media, so little time. So says Mr. Media, a syndicated column and Web site that takes a tongue-in-cheek look at media and pop culture. "It's like a personality section strongly tilted toward the Web," says Bob Andelman, a k a Mr. Media. Past editions have covered Bob Dole's antics in Iowa, the *Too Much Coffee Man* comic strip, and the self-described anti-*Sassy* magazine *Ben Is Dead*. Andelman put up the Web site in March 1995 and, within a year, attracted 4,000 subscribers worldwide. A freelance correspondent for *Newsweek*, Andelman's a busy guy. How does he do it? "I am Mr. Media," he says. "I read, watch, and listen to everything!" – *Laura Linden*

Mr. Media: email *andelman@mrmedia.com*, on the Web at *www.mrmedia.com/mrmedia/*.

## Hushed Market Buzz

*Pssst!* Here are a couple of insider tips: First, invest your financial holdings in cellular technology. Second, divest your emotional holdings in noise.

Why? Because two of the world's largest stock exchanges, the American (AMEX) and the New York (NYSE), are going wireless.

PHOTO: MICHEAL McLAUGHLIN

*A car.*

*With something called rail-through construction.*

*Which stiffens the body,*

*which quiets the cabin,*

*which makes it the sanctuary that lets you forget*

*(your doubts, your insecurities, your boss),*

*and allows you to think,*

*and the thought is the same*

*as yesterday,*

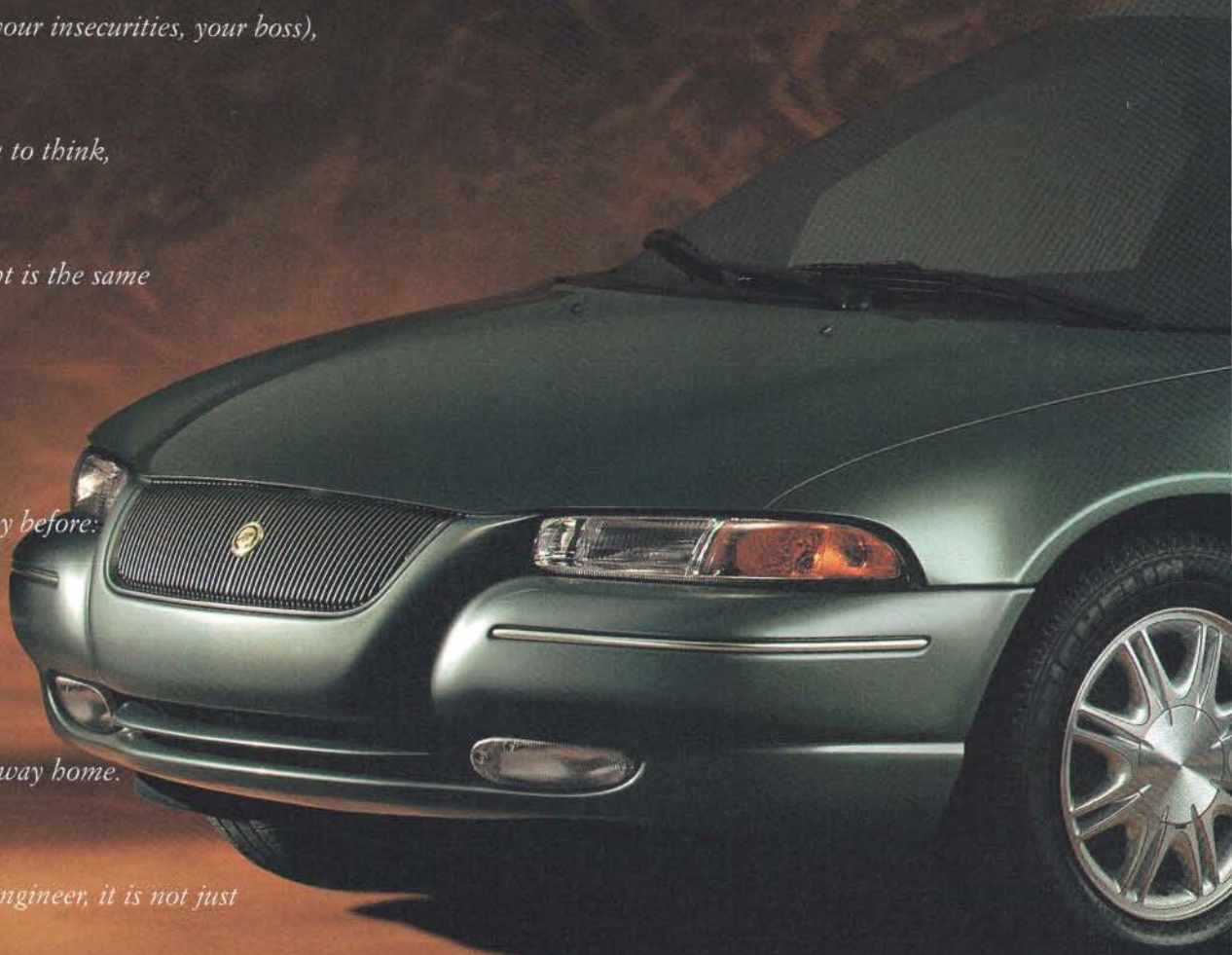
*as it was the day before:*

*Tomorrow...*

*I find a longer way home.*

*To a Chrysler engineer, it is not just*

*a car.*



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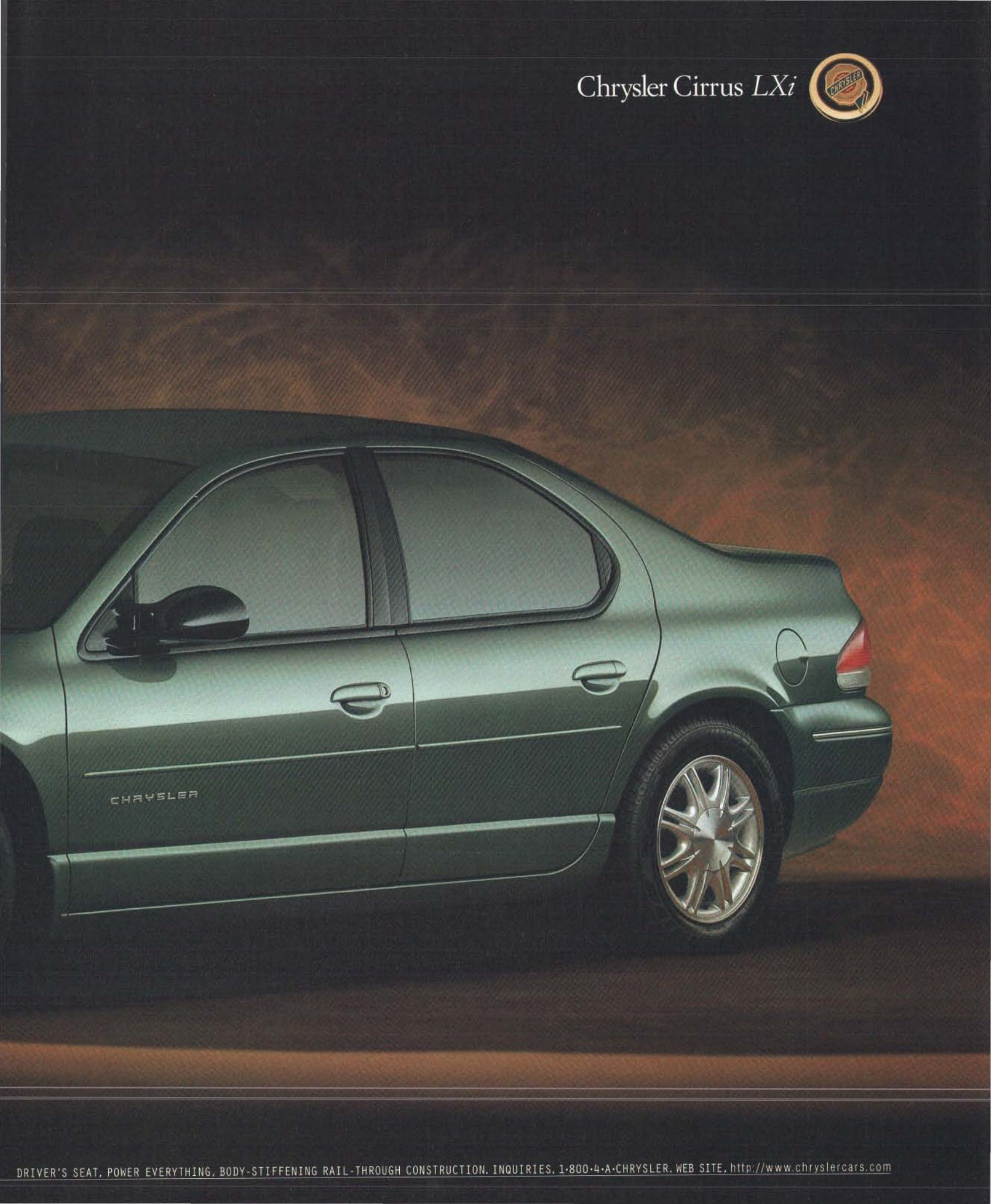


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Before long, their uproarious trading floors will be transformed into busy hives of hushed activity.

Both Wall Street landmarks have long been raucous madhouses with hundreds of buyers, sellers, and go-betweens shouting out deals simultaneously. From this sea of chaos has emerged a longstanding indicator of market activity: shouting volume and trading volume always maintain a 1:1 ratio.

All that is changing. Both exchanges are independently testing and installing cellular systems that allow brokers to roam the floor with personal digital assistants that can process orders and transmit information to the famous stock ticker. The exchanges expect to complete the backbones of their PDA local area networks later this year.

The PDA system has many benefits, including faster order placement, greater accuracy, and better customer service. Warren Kaiser, a senior vice president at the AMEX, says PDA-mediated trading is an "extremely significant" development that essentially transforms brokers into roaming workstations.

There are other effects, too. With orders placed via wireless devices, paper trading slips are becoming a thing of the past. And the NYSE floor is becoming a lot quieter, as information that brokers once shouted evaporates into cellular thin air. Comparing this with the trading-floor environment of a few years back, Richard Edgar, a Big Board executive vice president, explains, "Although the general clamor is now at much lower decibel levels, we're dealing with much higher trading volumes than we were in the past."

So the shout-to-trading ratio has been reversed. For pundits who have long used noise as a measure of market activity, the PDA takeover probably seems like a hostile bid for the future. Nevertheless, with approximately US$22 million allocated to wireless projects at the NYSE alone, both exchanges speculate that hushed trading will generate a nice market buzz. And you can rest assured that traders will extract honey-sweet dividends from their new wireless hives. – *J. Schulz*

**The uproarious trading floor of the stock exchange will be transformed into a busy hive of quiet activity.**

## Wired Top 10

**Most popular Winsock applications (as of January 31, 1996)**

| Application | Description | Number of downloads |
|---|---|---|
| **1.** Netscape Navigator | Web browser | 5,089 |
| **2.** NET TOOB | Multimedia viewer | 3,451 |
| **3.** HotDog Pro | HTML editor | 2,694 |
| **4.** WIRL | VRML browser | 2,631 |
| **5.** CuteFTP | FTP client | 2,302 |
| **6.** News Xpress for '95 | Usenet news reader | 2,119 |
| **7.** WebPhone | Internet phone client | 1,998 |
| **8.** MS Internet Explorer | Web browser | 1,567 |
| **9.** mIRC | IRC client | 1,449 |
| **10.** Eudora Pro | Mail program | 1,187 |

Source: The Consummate Winsock Apps List, on the Web at *cws.wilmington.net/* or *www.enterprise.net/cwsapps/*.

– *Gareth Branwyn*

**Call your broker: Cellular technology is in, trading slips and noise are on the way out.**

### Music, Hold the Mayo

Try this for an oxymoron: "nonprofit record company." San Francisco-based No Mayo is precisely that. Using proceeds from record sales and merchandising, the company funds art education and mentor programs for economically disadvantaged young people. The label's first release, an album by R&B vocalist Mike Marshall, will hit the shelves later this year. As No Mayo co-founder Hershel Berry explains, "Mayonnaise is a word used to describe people who grow the goatee first and learn to play the guitar second. No Mayo uses music to help people in tangible ways by backing up the melodies with action." – *Todd Lappin*

No Mayo: +1 (415) 421 3361

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### Bugs in the System

Cockroach World *(www.nj.com/yucky/)* proudly bills itself as "the yuckiest site on the Internet." With witty illustrations and insights into the lifestyles of our helmeted friends, Cockroach World makes pestilence downright cute. Created by New Jersey Online & Liberty Science Center, this site has more roaches than an entire block of East Village walk-ups.
– *Mary Elizabeth Williams*

## Flame Retardant

**Flames are an environmental hazard of cyberspace. They sneak up on you, drop into your mailbox, and – *wham!* – burst across your screen in an irritating profusion of venom and bile. Flames are verbal attacks spread by computer-mediated communications, and they're all over the Net. That's what drove Ellen Spertus to write Smokey, an AI-based system that automatically detects flames before they explode in your face.**

**Spertus created Smokey last summer while working at Microsoft Research. The system, which uses an experimental natural-language parser, a decision tree, and a bunch of Lisp code, can actually separate flames from ordinary email messages. This makes it easy to file them away for reading later – or never at all.**

**To develop the program, Spertus worked with webmasters from three controversial Internet sites – Fairness and Accuracy in Reporting, NewtWatch, and The Right Side of the Web. With more than their fair share of hate mail, these sites were only too happy to provide her with copies of messages they'd received.**

**Smokey is an AI-based system that detects email flames before they explode in your face.**

Ellen Spertus: Her software filters out flames sent by bozos who need to get a life.

**Right off the bat, Spertus realized that one site's flame is another site's fan mail. To solve this problem, she developed a set of linguistic rules for detecting flames and a set of site-specific plug-ins for villains and heroes. Thus, an email to NewtWatch bemoaning Slick Willy (President Clinton) is quickly identified as a flame, whereas the same note sent to The Right Side of the Web scores high marks for accuracy.**

**Spertus also learned that even though flamers target different enemies, they often share a common grammar. They tend to use noun phrases as appositions – for example, "you bozos," "you flamers," and "you people." Likewise, these irate mailers often use the word *get* followed (within 10 characters) by the words *life*, *lost*, *real*, *clue*, *with it*, or *used to it*. Fifty of these such rules, fired in rapid succession, allow Smokey to distinguish good from bad mail.**

**Spertus believes Smokey demonstrates that automated, intelligent email filtering is possible. She also thinks other applications could benefit from her research. "When mail comes into a company, a program like Smokey could direct it to the right department," she predicts. "That way, big companies such as IBM wouldn't have to hire dozens or even hundreds of people to read incoming messages from some *info@ibm.com* address."**

**After recently handing the project over to Microsoft, Spertus plans to finish her PhD at the University of Washington and MIT. Now it's up to Chairman Bill to decide Smokey's fate.**
**– *Simson L. Garfinkel***

## Miracle Dealer

Diana Creer-Berti has cerebral palsy, suffers chronic muscle spasms, can't type, can't talk, and uses a wheelchair to get around. Yet this hasn't stopped her from earning an associate's degree and writing two books.

She owes much of her success to Don Dalton, president of Micro Overflow Corp. of Naperville, Illinois. Dalton is a miracle dealer who helps people such as Creer-Berti use computers to lead more productive lives.

"People with disabilities want to work more than anyone," Dalton says. "Although they might not be able to type 100 words a minute, many can talk it. With today's technology,

# Faster than your Uncle Ralph can get it together...

It's been said that time waits for no one... *Except, that is, when Uncle Ralph wants to take a picture.* Thank goodness getting photos into your computer doesn't take nearly as long - thanks to EasyPhoto Reader. With the quick press of a button, ClearScan™ technology captures up to 1200 dpi enhanced resolution, true colors, and sharper details from your own photos. Crop, resize, rotate – even remove red-eye in the Photo Workshop. EasyPhoto Reader Works with almost any application. And it plugs right into the back of your computer (no board required). Integrated ClearPrint™ algorithms automatically adjust your photo so it prints perfectly on any inkjet or laserprinter. And you get it all for only $249. (Mac version also available). It's never been easier to create more memorable letters, invitations, flyers, reports – even a web page – with your own photos. To get an EasyPhoto Reader, just ask your retailer or call 800-275-5734 to order.

## *Easy*Photo Reader can put it in a letter.

*Begin with an ordinary letter, invitation, flyer, etc.*

*The EasyPhoto Reader lets you add your photos quickly and easily with the push of a button.*

*Drag and drop your photo anywhere with EasyPhoto software (included!)*

*Print out a great looking document with sharper, true color results – all for only $249.*

**EasyPhoto Reader**

*The easiest way to get your photos into a computer!*

*"The results are nothing short of stunning" – PC Magazine*

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some disabilities can be effectively erased."

Dalton should know. He's a quadriplegic who started his business – a million-dollar-a-year company that specializes in the sale of computer equipment for people with disabilities – out of his garage six years ago. Since then, Dalton has worked with hundreds of clients suffering everything from blindness to carpal tunnel syndrome, cerebral palsy to dyslexia, deafness to paralysis. Micro Overflow doesn't invent the technologies it sells – instead, it tailors computer packages to suit individual needs.

The potential market for such tailoring is immense. Roughly 20 percent of the US population – 43 million Americans – has some form of disability. "As medical technology improves, we're keeping more people alive who would have died before," Dalton says. "The size of the disabled population will eventually equal that of the nondisabled – perhaps as soon as 2005."

Dalton's business received a boost when the Americans with Disabilities Act was signed into law in 1990. The act prohibits employment discrimination on the basis of physical disabilities and requires employers to make "reasonable accommodations" to give those with disabilities equal opportunities to work. As a result, the market for assistive technology has exploded.

To help Creer-Berti, Dalton attached a notebook computer to her wheelchair and set up a voice synthesizer, a scanning keyboard, and software that gives the gift of gab to those with speech impairments. Using a set of onscreen keyboard matrices, which Creer-Berti accesses by touch, she can control all the functions of her computer and choose words, phrases, and numbers from a menu. And using the voice synthesizer, she's able to "talk" with others.

**Micro Overflow can give the gift of gab to clients with speech impairments.**

"We're not product-driven, we're solutions-driven," says Dalton of his company of eight employees, five of whom have disabilities. "Our clients don't want special favors. They want employers to hire them because they can do the job as well as anyone who doesn't suffer a disability." – *Adam Penenberg*

Don Dalton: Using computer technology as an empowering agent.

## Jargon Watch

**Ant Farm**
Huge multiscreen theater complexes with glass façades, often found near American malls. Also called gigaplexes.

**CGI Joe**
A hardcore CGI-script programmer with all the social skills and charisma of a plastic action figure.

**Dorito Syndrome**
Feelings of emptiness and dissatisfaction triggered by addictive substances that lack nutritional content. "I just spent six hours surfing the Web, and now I've got a bad case of Dorito Syndrome."

**Under Mouse Arrest**
Getting busted for violating an online service's rules of conduct. "Sorry I couldn't get back to you. AOL put me under mouse arrest."

**Umfriend**
A sexual relationship of dubious standing. "This is Dale, my … um … friend."

**Glazing**
Corporate-speak for sleeping with your eyes open. A popular pastime at conferences and early-morning meetings. "Didn't he notice that half the room was glazing by the second session?"

– *Gareth Branwyn* (jargon@wired.com)

*Tip o' the crash helmet to Mike Fisher, Mark Frauenfelder, Adrienne Greenheart, Laura Lemay, Sheila O'Shea, and Bruce Turkel.*

### The Aesthetics of Equity

Scripophily (collecting stock and bond certificates) is the art of the deal – literally. Since the 1800s, industries have engraved ornate stock certificates as both a pictorial testament to their economic power and a way to thwart counterfeiters.

But today, digital trading is rendering stock certificates obsolete. Gary Dietz, president of Dietz Associates *(www.robinsoft.com)*, wants to preserve these old certificates. "Our Web site shows people the beauty and historical value these collectibles bring," Dietz says. "Visitors can look and learn, or they can buy." Yeah, at US$25 to $3,000 a crack.
– *Jesse Freund*

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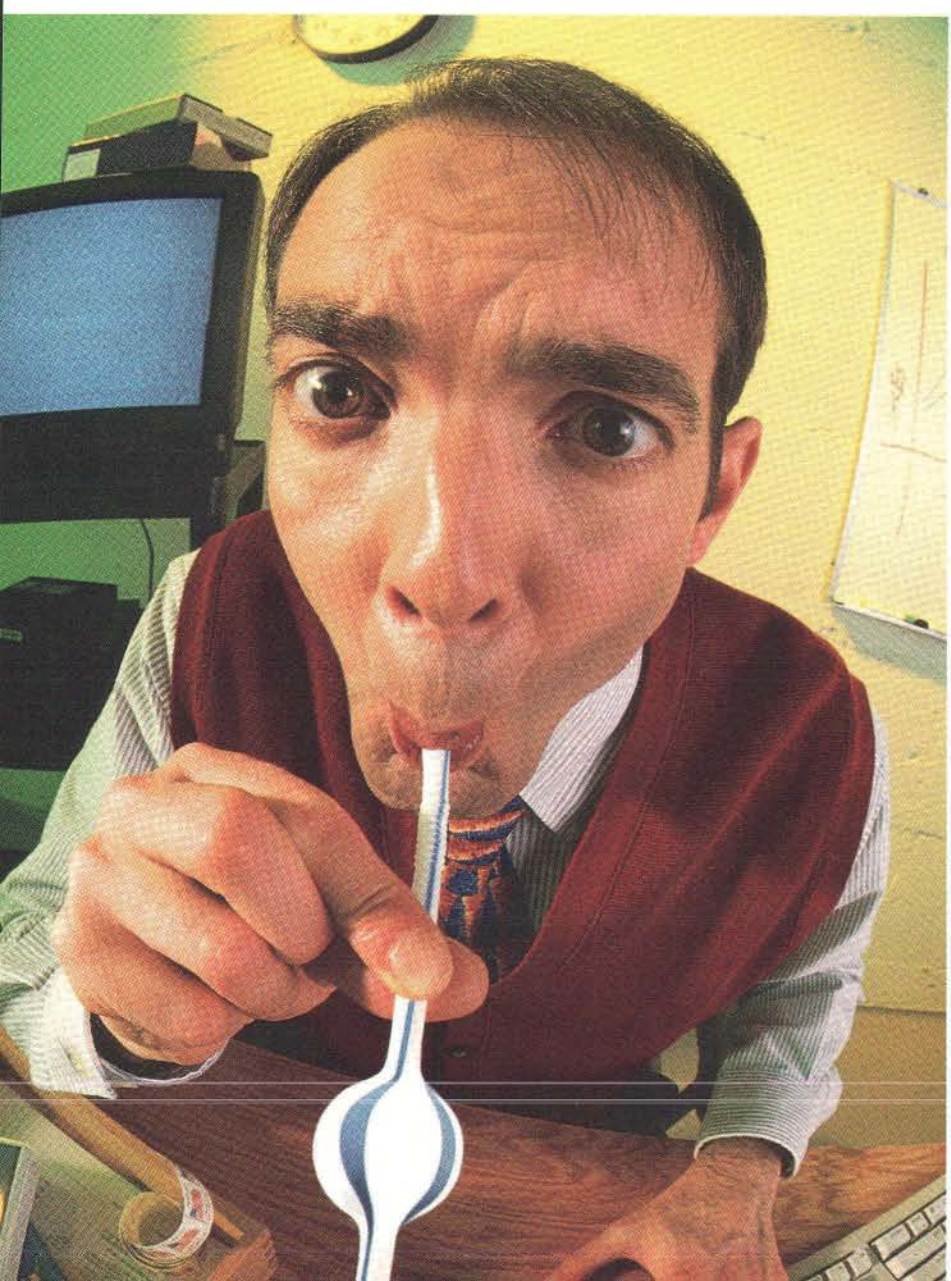

Got a 14.4 kbps modem? 28.8? If you're using a modem at all, you're probably not getting the bandwidth you need. So what's your phone going to do about it?

Introducing OfficePoint™ from Siemens Rolm: the first high-speed ISDN system for small businesses. It may look like an ordinary phone, but plug in your PCs and you'll be on the Net nearly five times faster than the fastest modem can carry you. That's faster email, faster Web access, and faster file transfer. With that kind of bandwidth, you can even send faxes and stream video–at the same time. And did we mention it's a great phone system?

So call us at 1-800-505-3111, ext. A1 or tap into the power of OfficePoint at www.siemensrolm.com/officept.htm. You can't afford to be underfed.

**OfficePoint. The Internet, fax, video system that just so happens to be a phone.**

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This collar's been around my neck since I was a pup. Had to let it out at least one notch every year. Good thing I'm now fully grown 'cause ain't too many more notches. Been wearing it so long I'd feel downright naykid without it. But I'll tell ya – if anyone said, "Hey Red Dog law sez you gotta wear a collar," this thing would be off quicker'n you can say Rottweiler.

**You are your own dog.**

Red Dog Beer. Bold, Uncommonly Smooth from the Plank Road Brewery.

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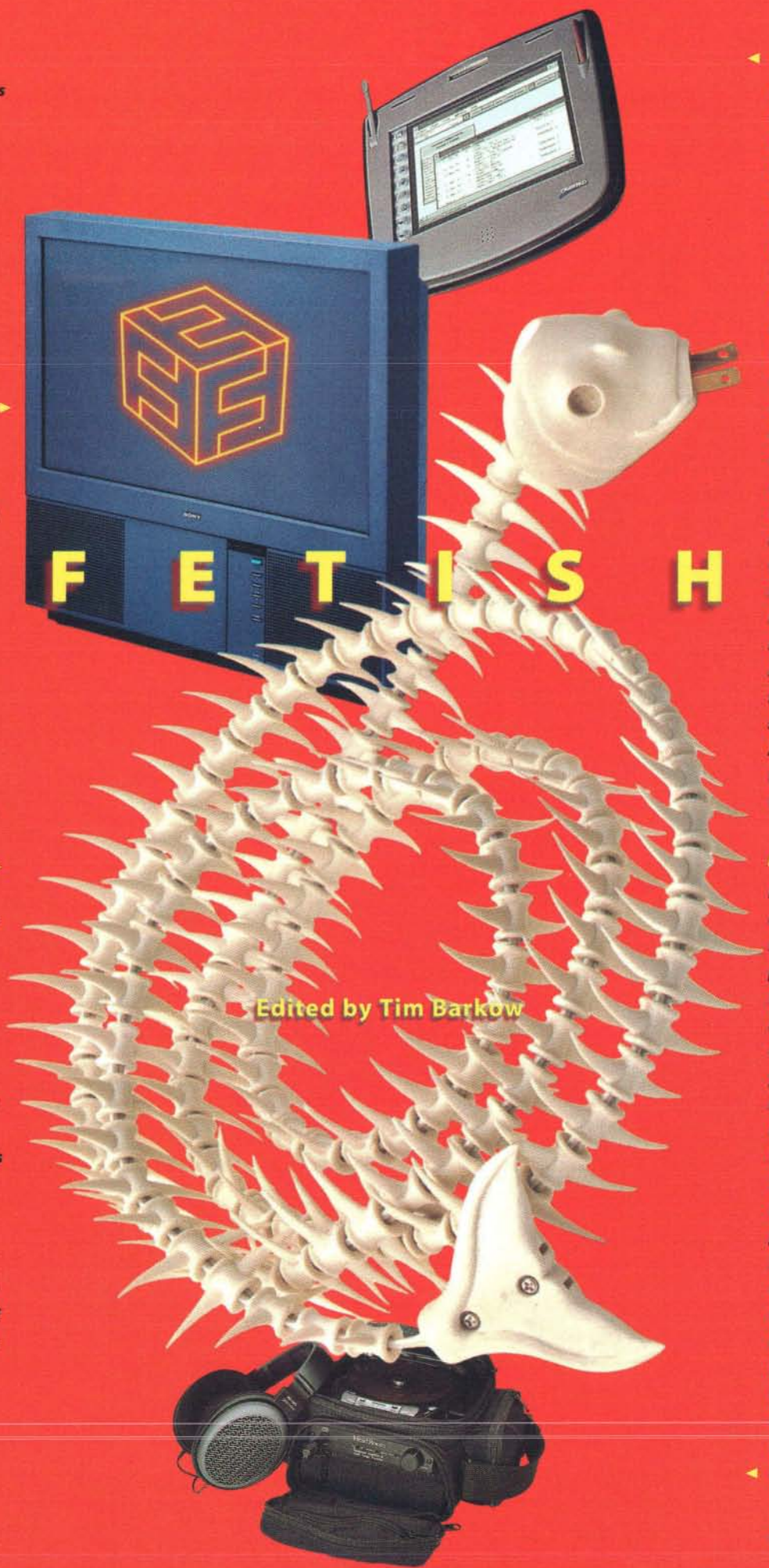


### Beam Screen

Projection television has finally seen the future. Sony has replaced the bulky, conventional picture tube with three LCDs measuring 1.35 inches diagonally. Each LCD is assigned to one of the primary chrominance signals – red, green, and blue – and a dichroic prism recombines the output into a full-color image. How's that for a science lesson? Currently on sale only in Japan (a 37-inch screen is ¥330,000, about US$3,260), these projection TVs are less than 15.5 inches deep, sport a 600-line resolution, and include a 3-D sound system. Sony Corp.: (800) 222 7669.

### Dem Bones

Meiwa Denki is a Japanese performance and musical group whose name is often mistaken for that of an electronics firm (denki means electric machinery). Rather than change its name, the group decided to develop a line of "art-utility goods." Its first release: the Na Cord, an extension cord shaped like a fish skeleton (na is a pronunciation of the Japanese character for fish). Its eyes even light up when plugged in. Piles of power cords are an eyesore, but chains of fish skeletons? Na Cord: approximately ¥5,000 (US$50). Sony Music Entertainment: +011 (81) 3 3266 5799, fax +011 (81) 3 3288 7255.

### Wireless Wandering

Nobody sits at a desk all day anymore, so why tether a computer there? Instead of burdening workers with PDAs and new software, Zenith has developed MultiCruise, a system that frees PCs to follow their users around the office. Wireless CruisePADs let employees run Windows-based sessions off a central server; unlike other PDAs, MultiCruise utilizes all your existing Windows programs. And the server's the only computer you have to maintain. Suddenly a regular network doesn't seem like such a bargain. MultiCruise: US$68,575 for a typical 30-user system, options vary. Zenith Data Systems: (800) 582 0524, on the Web at www.zds.com/.

### Porta-Power

Remember when having a portable stereo the size of a Yugo was the pinnacle of cool? HeadRoom offers a line of industrial-strength accessories that'll make your portable CD player sound the way it should have when you bought it. The Traveller with 580s includes a pair of Sennheiser 580s headphones, the HeadRoom Supreme headphone amplifier, D-cell battery module, carrying case, cable, and a 12-CD wallet. Maybe you can take it with you. Traveller with Sennheiser 580s: US$799. HeadRoom Corp.: (800) 828 8184.

Mission Briefing: Problem reported at Bio-Weapons Research facility in Raccoon Hills. No communication with Science Staff in six weeks. No

©CAPCOM CO., LTD. 1996 ©CAPCOM U.S.A., INC. 1996. ALL RIGHTS RESERVED. RESIDENT EVIL is a trademark of CAPCOM CO., LTD. CAPCOM is a registered trademark of CAPCOM CO., LTD. PlayStation, the

Your team should not be misled by the neat and orderly appearance of this isolated mansion. A major corporation's been conducting questionable research here. You'll soon discover the results of some very, very careless experiments.

From hyper-realistic 3D lighting and an ominous CD quality sound-track and special effects, to unique action perspectives, this intense drama unfolds, building terror and suspense with every new room you wander through.

Fight or flight? When you're under-powered and on the run, split-second decision making abilities are key. Discover and arm yourself with anything you find: knives, pistols, shotguns, flame-throwers and more.

This twisted 32-bit polygon-based blood-bath isn't limited to gleaming dining rooms and endless polished hallways. Answers are found in darkest corners of the estate cemetery, crumbling guest houses, and a mysterious tower.

response from initial reconnaissance team. No backup. You are on your own.

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PlayStation

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### Vertical Computing

When the computer leaves the desktop, most folk assume that means portables. Why not take a shorter leap and move that box of wires onto the wall? Vent Design Associates's PC is part of GE Plastics's concept house of the future, built in Pittsfield, Massachusetts. The vertical case houses a printer and a CD-ROM jukebox, while the wireless screen and keyboard sit on the desk. It's PC as home appliance, a concept that doesn't seem that far-fetched when you recall that some people think smart refrigerators are an idea whose time has come. Vent Design Associates: +1 (408) 559 4015, fax +1 (408) 559 4036.

### Hold Everything!

While there's a clicker for everything these days – and they always seem to end up between the couch cushions – PC VisionTouch may be the only control module you need. It consolidates the basics (VCR, TV, stereo) but goes much further in its quest to add virtuality to your pad. Using a PC as its nerve center, this mother of all remotes allows you to program up to 120 aspects of your home – the lights, the burglar alarm, even the coffeemaker. Now, where did I put that little thing? PC VisionTouch: approximately US$300. Sony: (800) 222 7669.

### Big Band, Little Band

The trumpet is the flower of the band. But finding a place to practice isn't easy. Unless your nearest neighbors live miles away, some unfortunate soul will always suffer as you honk away. The folks at Yamaha feel your neighbor's pain. The Silent Brass System plugs into the bell of your bugle, acting as a mute. But it also connects to a mixer and headphones that provide a practice session only you can hear. Bring a few friends over, run an electric guitar or keyboard through the mixer, and presto! You've got an instant rock band – a surprisingly quiet one. Silent Brass System: $US299. Yamaha Corp.: +1 (714) 522 9011.

### Über Newt

Drop your Newton and there's a good chance it's toast. Digital Ocean builds Newtons for those who can't worry about pampering their PDAs. The Seahorse wraps a Newton MessagePad in a rugged rubber sheath, offers extended battery power and a range of communications options, including wireless LAN, CDPD modem, GPS, and diffused infrared. If Timex made computers, this would be its flagship model. Seahorse: US$2,100. Digital Ocean: +1 (913) 888 3380, fax +1 (913) 888 3342, on the Web at www.digocean.com/.

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K 1100 RS: $15,390 (standard with ABS).
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dealer or call 1-800-345-4BMW.
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### Hard Disk

**FieldWorks positions the FW5000 as the "suburban utility vehicle" of computer notebooks. When you sell computer systems that are up to military snuff, you can say stuff like that. The FW5000's one-piece, magnesium-alloy chassis will withstand up to 100 Gs of operating shock, and the system is internally cooled so dust and – with an optional package – rain never get a chance to muck up your hardware. And the FW5000 includes additional options for CD-ROM drives, expansion cards, and processor upgrades. If you've got to lug a laptop around, why not pack one that can hit the road – literally? It's a great party trick. FW5000: US$4,995. FieldWorks Inc.: +1 (612) 947 0856, fax +1 (612) 947 0859.**

### That's Some BBQ

**Lugging around a messy pint-size grill is no way to enjoy your summer. Step up to Belson's Mobile II Porta-Grill II. The Porta-Grill has 12-inch tires, dual tail-brake lights, a 1 7/8-inch coupler, and a swing-tongue jack. When you get right down to it, there is no substitute for superior grilling equipment. Mobile II Porta-Grill II: US$3,353. Belson Manufacturing Co. Inc.: (800) 323 5664, +1 (708) 897 8489, on the Web at webmart.freedom.net /belson/.**

### Race Tracing

**Ever created three-dimensional models? No, of course not. The mere idea is user-unfriendly. But the MicroScribe-3D might change your mind. This balanced, robotlike arm is a high-precision digitizing instrument that simplifies the modeling process down to tracing an object's contours. The MicroScribe is accurate to within .017 inches and comes with a choice of digitizing software. Remember, the time you save might be your own. MicroScribe-3D for Mac and PC: US$3,495. Immersion Corp.: +1 (408) 467 1900, on the Web at www.immerse.com/.**

### Ducks in a Row

**Everyone says their product is amazing. But Bang & Olufsen's BeoSound 9000 six-disc CD changer delivers. Under its translucent cover, six CDs fit snugly inside individual slots. The 9000 can sit flat, mount on the wall, or stand on its side attached to an optional stand. Best of all, Bang & Olufsen's design avoids the black-box pretension that usually surrounds audio equipment, while retaining the same mystery and awe that surrounds classic cars like the Thunderbird. BeoSound 9000: US$4,000. Bang & Olufsen: (800) 323 0378.**

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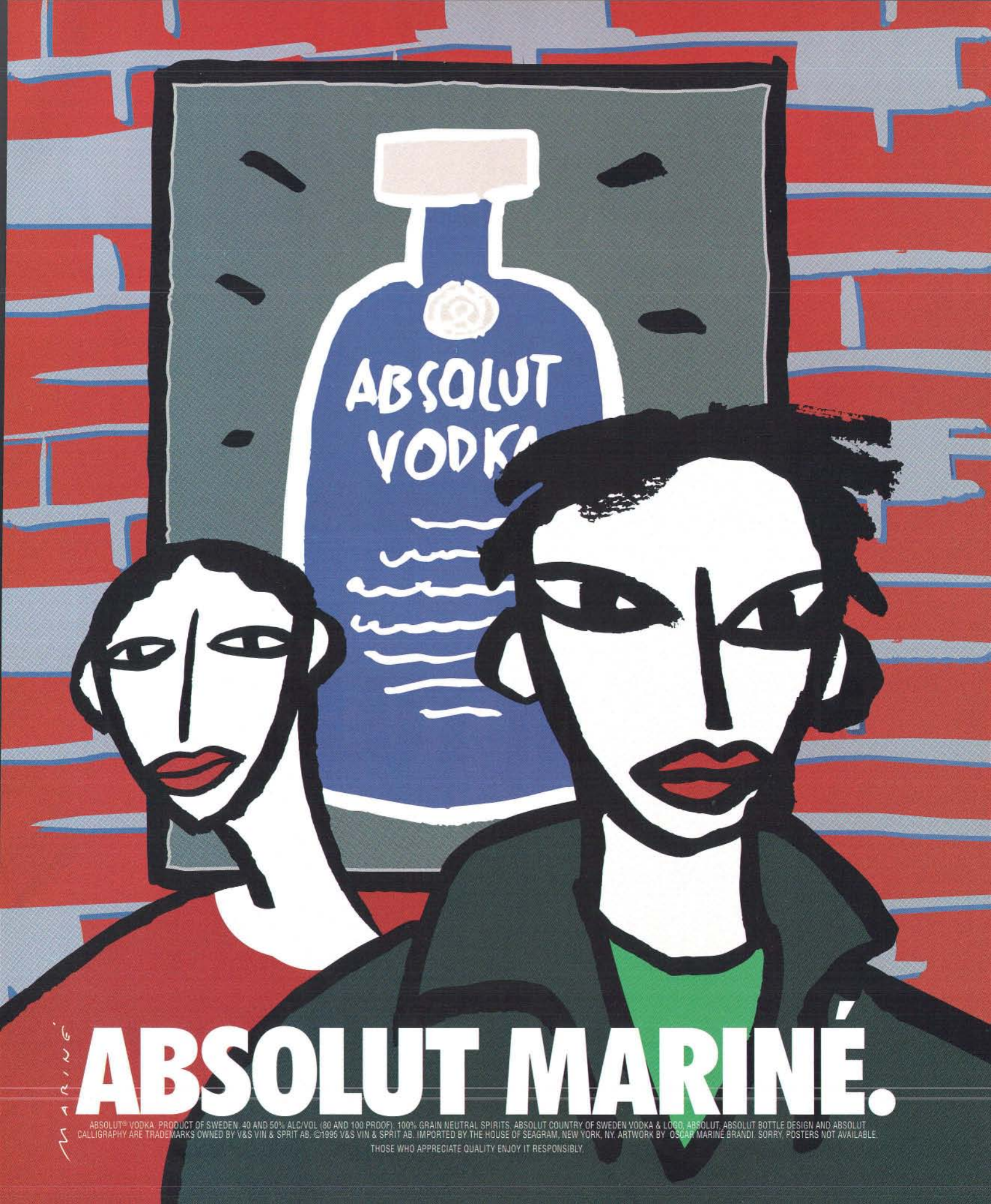
**Thanks to Larry Smith, John S. Couch, Chiyo Toda, and Wired Japan.**

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THOSE WHO APPRECIATE QUALITY ENJOY IT RESPONSIBLY.

*INNOVATION IN UNISON:* IBM & PHILIPS SEMICONDUCTORS

The point of this story is the red one on the next page. It's called the IBM TrackPoint,™ and while it may be miniscule in size, its impact on keyboard design (not to mention sales of IBM ThinkPads) is immense. ➢ The TrackPoint began, as such ideas often do, in the mind of one person — IBM scientist Ted Selker. In 1988, Ted realized the traditional computer mouse left something to be desired; namely compactness and ease of use. So he created a fingertip device planted squarely in the center of the keyboard. Presto. A faster, less tiring way for people to use their computers, without their hands ever leaving the keyboard. ➢ What developed next is what innovation (and this ad campaign) is all about. In response to IBM's need for an ideal microcontroller, Philips Semiconductors came "on-board" with the design-in of their advanced TrackPoint Microcontroller (TPM). Many deadlines and decisions later, TrackPoint debuted in October, 1992 as the centerpiece in IBM's ThinkPad™ 700 notebook series. This milestone was followed by an agreement enabling Philips to market TrackPoint software embedded within the microcontroller as an OEM drop-in solution. ➢ A success story, to be sure. But the best part is yet to come. As we speak, IBM and Philips are working hand-in-hand on next-generation TrackPoints powered by a Philips microcontroller now in development. When completed, this cutting-edge controller will offer superb integration plus a range of innovative features. ➢ So, is there a moral to our story? At CMP's OEM Group, we believe it's this. When companies like IBM and Philips work together as one, the results can be extraordinary. And that's hardly a small point to make about the power of our audience.

CMP Publications, Inc.

*IBM Innovators (from left): Bob Olyha, Joseph Rutledge, Ted Selker.*

*Philips Innovators (from left): Bill Houghton, Chuck Seaborg, Ata Khan.*

**LOOK WHAT DEVELOPS**

*For more information about the TPM749 or other microcontrollers, contact Philips Semiconductors at 1.800.447.1500, ext.1256 or http://www.semiconductors.philips.com*
*To learn more about IBM TrackPoint, call 214.280.6065 or access http://www-i.almaden.ibm.com/cs/showtell/ui/tp.html*

*Philips TrackPoint Microcontroller (TPM)*

*IBM ThinkPads featuring the TPM749-powered TrackPoint are among today's most popular notebooks. Soon, TrackPoints with Philips' new microcontroller could have everyone wanting to get their hands on one.*

*IBM 755CV Series ThinkPad*

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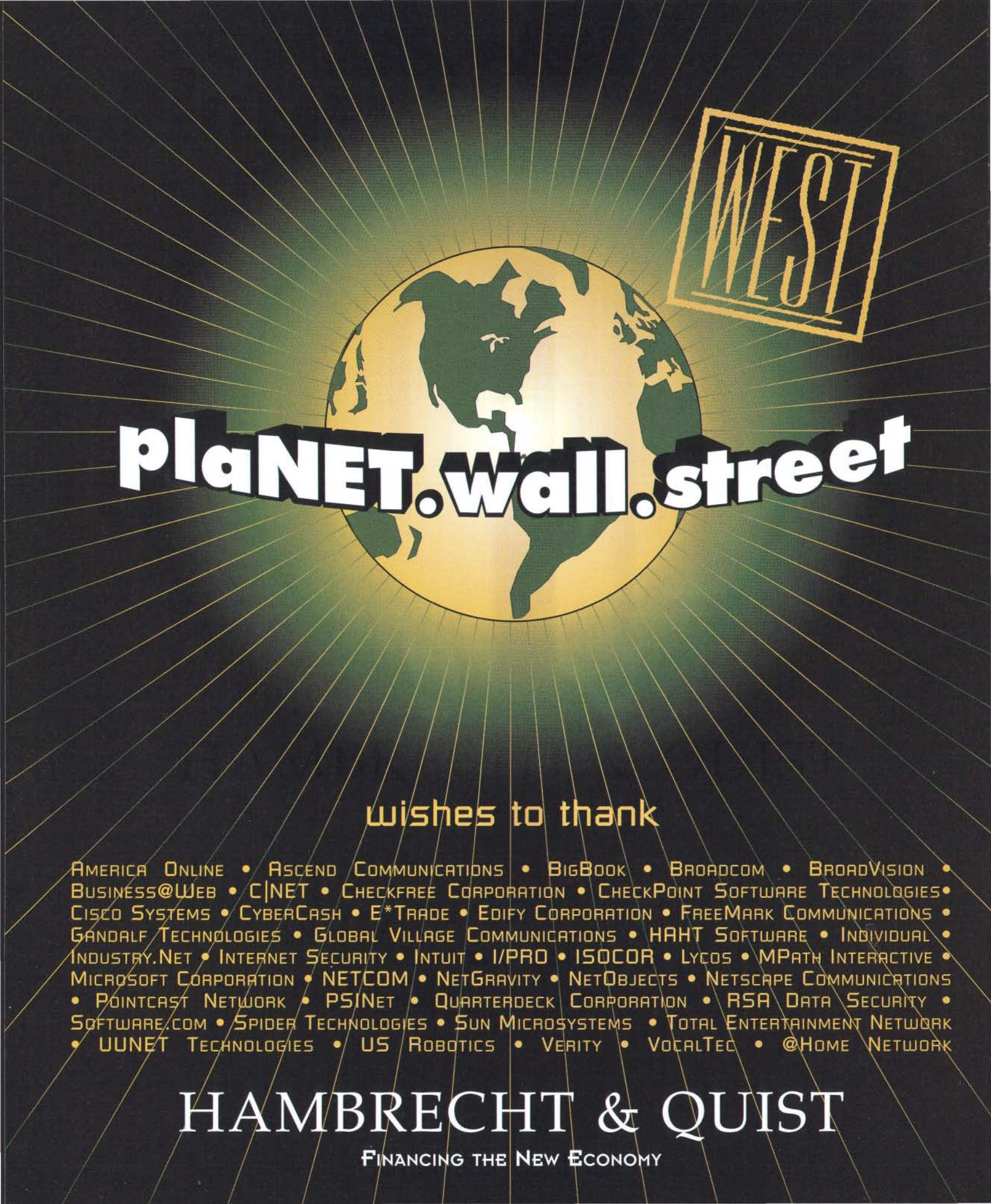


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# HAMBRECHT & QUIST

Financing the New Economy

THE NETIZEN

# Merchants of Venom

## The Republicans went to New Hampshire to wage state-of-the-art TV war.

## There were no survivors.

**By Bruce Sterling**

www.netizen.com/venom/

**This is not political coverage as usual.** *Wired* magazine and its online cousin *HotWired* have joined forces to produce *The Netizen*, a new magazine/Web site providing an innovative package of daily, weekly, and monthly coverage of the 1996 presidential election, the last campaign of the unwired generation. **John Heilemann** is filing an up-to-the-minute diary of the campaign in his "Impolitic" column on *HotWired (www.netizen.com/)*. Also look for **Brock N. Meeks**, who is reporting daily in his column "Campaign Dispatch."

Being a Texan brings many splendid advantages. For one thing, it forces upon me a proper humility when examining the political affairs of other states. We Texans unquestionably lurk deep in the murky sump of American politics, rivaled only by such lunatic backwaters as Louisiana and Arizona. After all, my native state trotted out Ross Perot and Phil Gramm as potential presidents.

But at least we're spared the cruel fate of New Hampshire. A formerly dear friend of mine who lives there recently sent me several solid, punishing hours of political ads from the New Hampshire Republican primary campaign. He strongly urged me not to watch those tapes all at once – but I'm a Texan, you see. I thought I was tough.

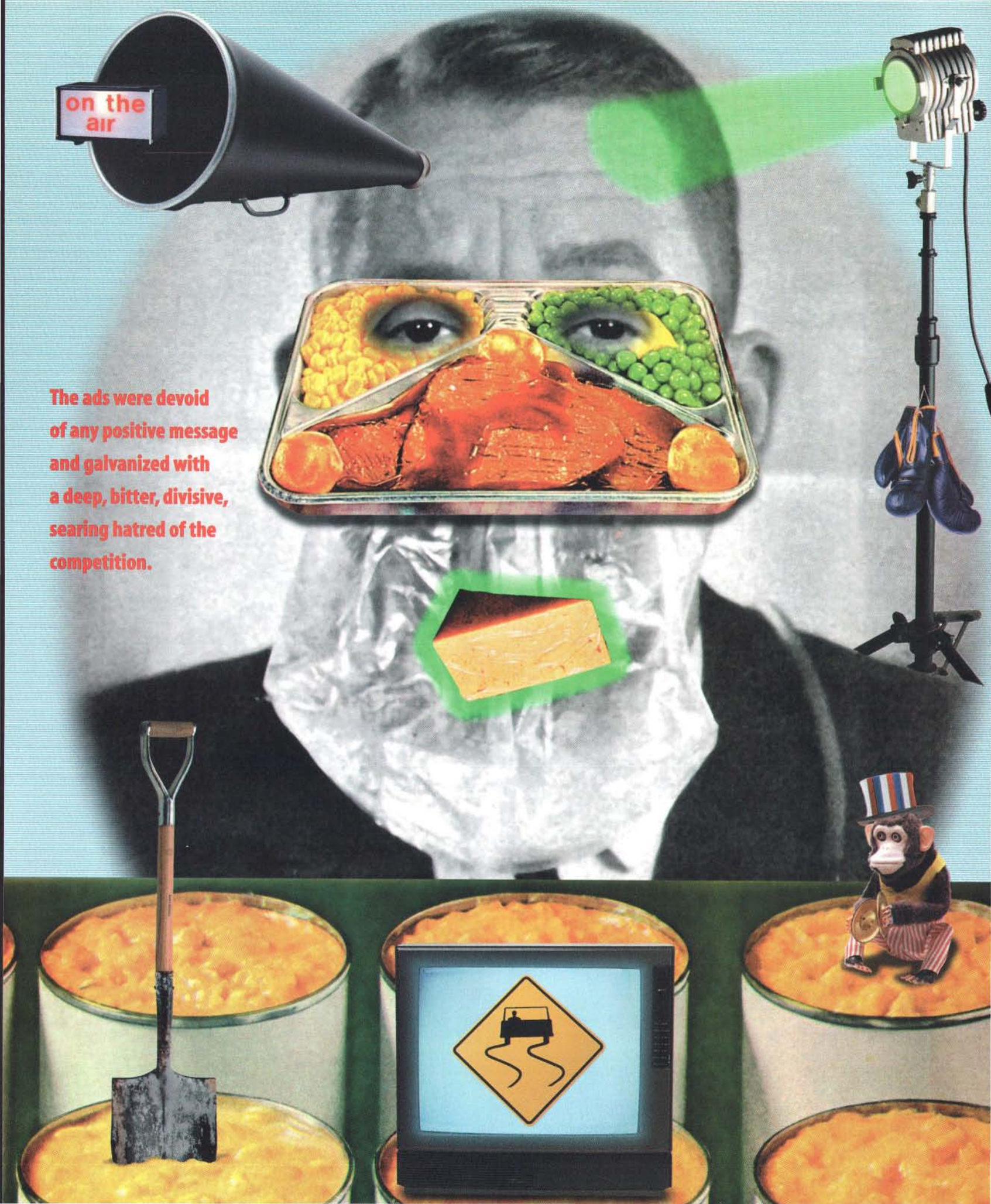
Some general impressions first, before my brain crumbles entirely. New Hampshire is a little bitty place. Texans have counties nearly the size of New Hampshire. Despite the crucial effect of the primary, it just doesn't pay to sink serious special-effects and set-design money into short-term ads that are targeted to such a tiny populace. So New Hampshire campaign ads look cheap. They're ugly. Even the ads of zillionaire Steve Forbes look like local cable-access fodder.

These ads attempt to make a virtue of their rustic simplicity. They seem to be aiming at some imaginary electorate of checker-wearing, gum-booted hicks in earflap hats. I don't for a moment suggest that New Hampshirites are like this in reality. As far as I can gather, most of them are whip-smart yuppie tax refugees, while the rest have enough old-time Yankee-peddler smarts to skin a flea for its hide and tallow. But watching the ads, I became convinced that the professional pols who commissioned and created them had no real idea who the people in New Hampshire are.

I'll go further: they didn't much care. Clearly, the operatives behind the campaigns hold the actual populace of New Hampshire in wary contempt. With the very conspicuous exception of Pat Buchanan, they weren't aiming their ads at the state's population but at each other.

New Hampshire used to be about "retail politics" – that was before candidates were habitually surrounded by a soldier-ant horde of TV journos and media hirelings brandishing shoulder cams and boom mikes. There is no longer any effective way for the average citizen to successfully break through the glass cocoon of presidential media coverage. There is, in point of fact, only one really good way to truly get to know the personality and beliefs of a modern presidential candidate. That's to join a presidential campaign staff. These people truly come to understand their candidates. So naturally they do their level ►

*Bruce Sterling* (bruces@well.com), *a regular* Wired *contributor, is the author of* Mirrorshades, *the definitive document of the cyberpunk movement.*


on the air
The ads were devoid of any positive message and galvanized with a deep, bitter, divisive, searing hatred of the competition.

best to keep the unhelpful truth from the rest of us.

One might get the impression (an impression staffers assiduously foster) that presidential campaign operatives are brilliant, multifaceted Svengalis whose omnipotent pollsters know what the mere rubes feel and think long before we ourselves can figure it out. That's an image of campaign kingmakers as Trilateral Commission puppet-master supermen, arm-twisters, diplomats, financial geniuses, world-class hustlers. The only man who actually matches this image is James A. Baker III. In reality, most campaign staffers are far more akin to James Carville and Mary Matalin, a man and a woman who – by their own frank confessions – are essentially fanatical seasonal migrant workers with bipolar disorder.

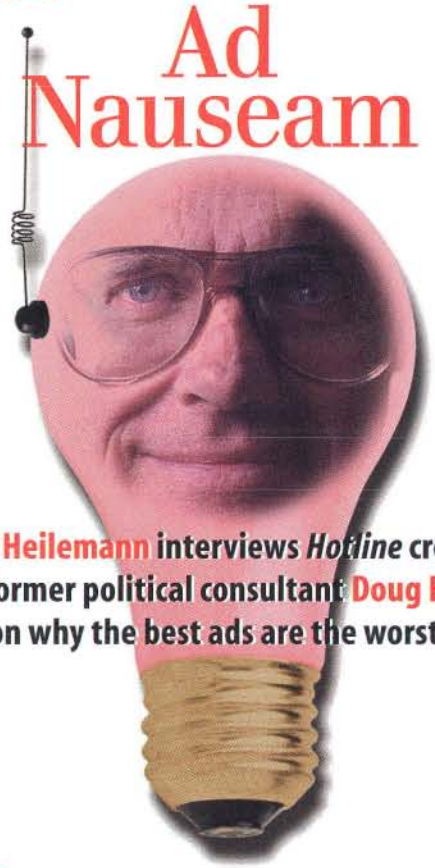
James Carville, you'll recall, got our last president elected. People in politics deeply fear this man and consider him a political genius. In his late 30s, he had been a broken-down swamp lawyer who could carry all his worldly possessions in one garment bag. He wasn't rich, he wasn't particularly influential, he had no post in government, and a lot of people sincerely thought he was nuts. Carville nevertheless got his man into the Oval Office.

Mary Matalin, the cold-blooded Republican spin doctress par excellence, took attacks on George Bush so personally that she became physically ill, had screaming fits on phones, sobbed aloud in the bathroom of *Air Force One*, and knocked back uncountable paper cups of red wine. Before Carville and Matalin joined in marriage, they spent many months during the '92 campaign beating the hell out of each other with the weaponry of television ads. They championed campaign media techniques that have since become commonplace and helped create the gruesome TV holocaust of New Hampshire '96.

"Going negative puts everybody in a mischievously productive and creative mood," Matalin confesses in the couple's awe-inspiring dual hagiography, *All's Fair: Love, War, and Running for President* (Random House, 1994/Touchstone, 1995). "For campaign junkies, it's a much more psychically rewarding challenge to slash the opposition than to cobble together another round of gushy, flag-waving, isn't-our-guy-great ads."

And Carville opines: "No one likes being under fire, but having a negative ad up against you is, in a way, fun. They're attacking us. It's like you're in a submarine and the alarm sounds and everybody runs to their battle stations.... Everybody is scurrying. 'Where's the fucking spot? I know it's a tax spot. What does it say? Don't give me that shit, that's not any good. We're coming up against a deadline. George, are the nets going to do anything with this? Is he going to get some free goddamn airtime off of this goofy spot?'" ►

# Ad Nauseam



**John Heilemann interviews *Hotline* creator and former political consultant Doug Bailey on why the best ads are the worst.**

Thirty years after starting a political consulting firm back when they were practically unheard of, and nearly a decade after leaving the business as a legend and diving headlong into a new-media venture, Doug Bailey has achieved something flash-in-the-pan partisan advertising gurus can only fantasize about: lasting relevance.

Bailey is chair and co-founder of the American Political Network, parent company to a clutch of online services whose flagship is *The Hotline*, a daily digest of political news regarded as more than merely indispensable by people immersed in the presidential campaign. Out on the hustings, *The Hotline* is the drug of choice; as afternoon rolls around, the hacks and handlers who haven't had their fix yet start muttering and pleading with their fellow travelers to help them score a hard copy.

Bailey is an addict, too. His memorabilia-strewn digs in Alexandria, Virginia, sport headlines from the 1976 presidential race, in which Bailey and his old partner, John Deardourff, nearly engineered a miraculous comeback for the fatally lame Gerald Ford. There are photos of Lamar Alexander, whom Bailey helped elect governor of Tennessee in 1978, partly by coming up with the idea that Alexander should parade around in a red plaid shirt. There are mementos from races that Bailey helped orchestrate for Bob Dole and Dick Lugar.

But by 1987, he'd had enough. Burned out by the ►

*John Heilemann is national affairs editor at* Wired.

Now that burst of frenzied obscenity is the genuine soundtrack from the war room of a modern American political campaign. It's information warfare, in which the civilian populace of New Hampshire are only collateral casualties. (It's amazing to learn how elaborate this process became. Toward the end, Matalin and Carville were only pretending to send ads – deliberate feints over the satellite feed intended to provoke an expensive counter-ad. Both sides produced spots in one instance: health care, then counter health care. Neither was ever seen by an actual voter.)

By the time he got to New Hampshire, Phil Gramm was already reeling from defeat in the bayous, where David Duke is Republican kingmaker and doesn't care for "conservatives" foolish enough to marry Asian wives. One Gramm spot proffered "Senator Phil Gramm on AMERICA'S MORAL CRISIS." This ad suffered from the same incurable malady that afflicted the rest of Gramm's campaign – it had Phil Gramm in it. Gramm had a fine professional campaign staff and a massive war chest, but in the national arena even Gramm's friends can't stand him. The camera dwelled relentlessly on Gramm's grumpy, balding mug as he hectored New Hampshire on moral propriety. "As we turned to Washington to take care of us, we've turned away from our families and our faith.... To reverse America's moral decline, we have to make Washington smaller." To actually witness "family and faith" exalted high above mere dictates of the decadent Feds, you need look no further than the Branch Davidians. These Bible-toting family folks lived a mere cannon shot from Phil Gramm's own College Station, and they would have cheered his message mightily.

**The elder Forbes was a zesty, dadaesque figure, but scion Steve has become "a good, decent man who cares about America."**

It's hard to figure what has happened to the Forbes clan. Old Man Forbes was quite an entertaining character, if you like the kind of colorful Gilded Age excess that fed champagne to racehorses. There's a raw, admirable, Unsinkable Molly Brown quality in a guy who bursts out of the closet in later life to ride Harleys, launch hot-air balloons, and blow a million bucks on a small army of belly dancers in North Africa. If you ask me, the elder Forbes was a zesty, dadaesque figure – especially compared with other publishers-gone-bonkers, such as the aggressive, paranoid, greedhead Hearst of San Simeon, or the spook-infested swindler and suicide Robert Maxwell.

But scion Steve Forbes has become, to quote his wife, "a good, decent man who cares about America." This may in fact be true. I can imagine a quite reasonable scenario where Steve Forbes looked 160 ►

nonstop madness of campaign life, and dispirited by the harshly negative turn the game had taken, Bailey left Bailey/Deardourff & Associates. Sensing that the 24-hour news cycle imposed by innovations such as CNN would explode the traditional market for campaign coverage, Bailey launched *The Hotline*. Bingo. Distributed at first largely by fax, *The Hotline* established itself with astonishing speed. By midway through the 1988 primary season, ABC's political director, Hal Bruno, had posted a sign on his door warning people not to enter unless they'd read that day's *Hotline*.

This year, Bailey took the inevitable plunge, teaming up with the National Journal to create a political Web site, PoliticsUSA *(politicsusa.com/)*. John Heilemann tapped into Bailey's unique perspective on the current negative-ad firestorm, and on what the future may hold for a form of communication that often seems as archaic as the political system that spawned it.

**Wired: People always complain about negative advertising. But in this campaign, there seems to be even more complaining than usual. Why?**

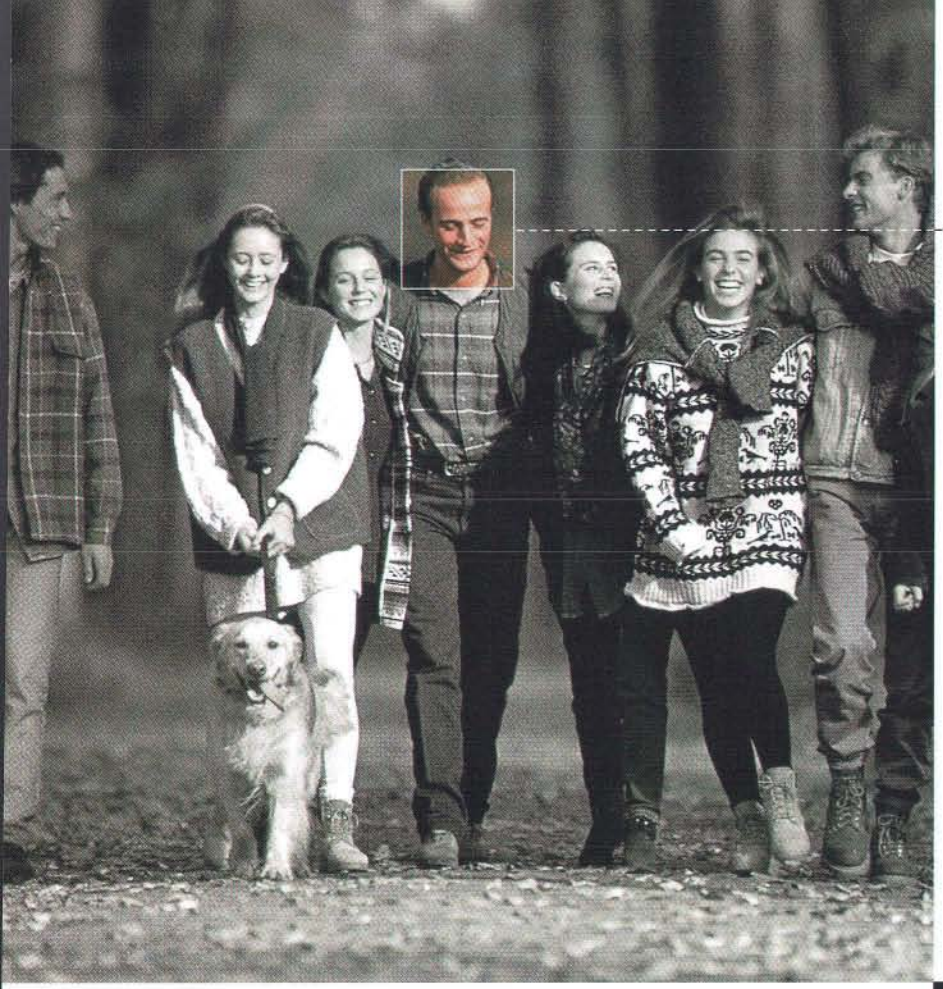
**Bailey:** I don't think the advertising is much more negative, but what's changed is there is much more of it, partly because of Forbes and partly because many candidates were pretty well funded in the early going. Also, in the absence of a positive campaign that would ignite people out there, it's the negative advertising that tends to dominate. And it has, obviously, turned a bunch of people off. That doesn't mean it hasn't been effective.

**Was it responsible for the supposed backlash against Forbes?**

I don't think negative advertising was the only reason for Forbes's collapse, but it was one significant reason. Remember that nobody knew anything about Forbes a few months ago. He ran some positive advertising on the flat tax. Then, the next thing anybody knew he was running all these negative ads against Dole. If you get known as a negative person, you have really hurt yourself, and you'll lose votes. That's particularly true in a multiple-candidate field. If Forbes runs a negative ad against Dole, it may hurt Dole but it also hurts Forbes – and it helps somebody else, whether it's Buchanan or another candidate, who picks up the vote because he wasn't hurt either by the ad or by running the ad.

**In 1964, Democratic adman Tony Schwartz made the seminal "daisy spot," in which a little girl picking flower petals turned into a countdown to a nuclear explosion. The ad never mentioned Barry Goldwater, but by evoking fears people already had about him, it was one of the most powerful negative ads ever.**

Absolutely. And the most effective advertising of 166 ►



Don Milenko

- E-mails new book draft to publisher.
- Visits Jazz Improvisation Web Site.
- Locates '71 Opel GT parts.
- Moderates Hemingway newsgroup.
- Organizes family reunion.

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# The Future of Cosmetic Surgery

**You've heard the hype. We asked the experts. Here's the *real* timetable.**

**Since the 1980s, cosmetic surgery has skyrocketed not only in popularity, but in controversy. Doctors can change what nature gave us, but the question remains whether having a thicker penis or bigger breasts outweighs the risks inherent in the medical procedure. Besides, who determines the proportions of a perfect body? *Wired* asked four experts about the future of tomorrow's designer body – which, surprisingly, may not be achieved in the operating room. – *David Pescovitz***

| | Effective Hair-Loss Prevention | Metabolic Fat-Burning Pill | Cosmetic Surgery for Men Equals Women | Nonsurgical Treatment for Aging |
|---|---|---|---|---|
| G. D. Castillo | 2003 | 2010 | unlikely | 2000 |
| Douglas Dedo | 2006 | 1999 | 2050 | 1998 |
| Marc S. Leventhal | 2010 | 2000 | unlikely | now |
| Steven Nathanson | 2006 | 2000 | unlikely | 2010 |
| Bottom Line | 2006 | 2002 | unlikely | 2001 |

**G. D. Castillo**
MD, Fellow of the American College of Surgeons, president-elect of the American Academy of Cosmetic Surgery

**Douglas Dedo**
MD, FACS, assistant clinical professor of otolaryngology, head and neck surgery, University of Miami Medical School

**Marc S. Leventhal**
MD, FACS, diplomat of the American Board of Cosmetic Surgery, editorial advisory board member of *American Journal of Cosmetic Surgery*, former board member of AACS

**Steven Nathanson**
MD, FACS

Ignore those infomercials hawking new shampoos that will resurrect your senior-picture hairline for only US$29.50 per month. According to our experts, Minoxidil and similar formulas are not that effective because, after all, male pattern baldness is a predetermined genetic trait. Dedo believes that if your grandfather has a shiny dome, the best way to prevent *your* forehead from expanding may be to genetically engineer your DNA, forcing your hair follicles to pump out fuzz regardless of what your hormones have to say. But, adds Castillo, if you're already in need of a toupee, no geneticist can bring back hair that's already gone.

Around the turn of the century – if our experts are correct – gym memberships will decline once we can pop fat-destroying pills after that second serving of chocolate cheesecake. Leventhal expects "improvement in metabolic fat burners currently on the market," while Dedo forecasts that the recent discovery of fat-metabolism compounds – which control the burning of fat – may lead to a chemical cure for love handles. But even if recent success rates with rats are applicable to humans, Castillo says the miracle pill "will have a limited effect on long-standing obesity." It's more likely to work for people who plumped up less than five years before treatment.

In 1994, more than 2 million women in the US went under the beauty knife compared with just over 568,000 men. And most plastic surgeons we spoke to don't see the scales ever balancing out. They expect that the percentage of men seeking some form of cosmetic surgery – liposuction, for example – will increase, but the powerful societal pressures that drive women to the operating room for face-lifts and ear-pinnings are difficult to change. Besides, Dedo says, "Because of the disparity between the death rates of men and women, there is a demand for older men among the surviving females."

Brittle bones, wrinkled skin, and other symptoms of old age may be a treatable condition within the next few years. According to Castillo and Dedo, growth hormones, currently prescribed by some doctors, have been shown to reverse the physical effects of aging by promoting muscle and bone growth and thickening the skin. A different approach, Nathanson points out, is to grow skin cells in a laboratory where they can be transferred to your body without scarring. It may soon be possible, he says, "to have a 'new coat' of youthful skin." On the other hand, Leventhal recommends a more traditional approach to reduce the ravages of old age. He simply suggests exercise, calcium supplements, and skin-care products.

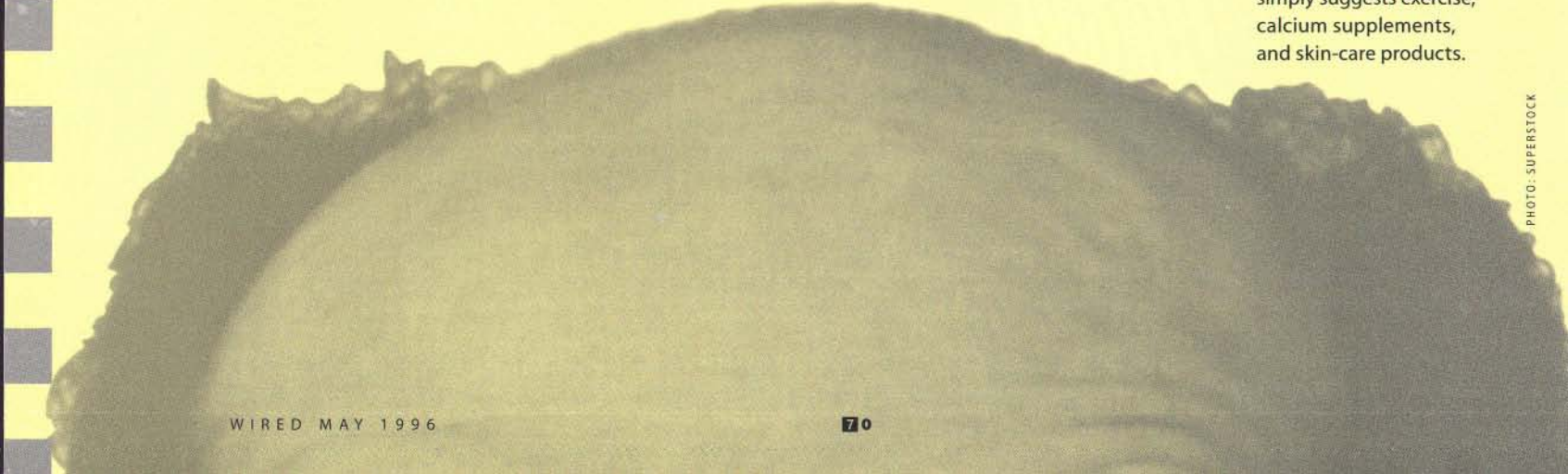

PHOTO: SUPERSTOCK

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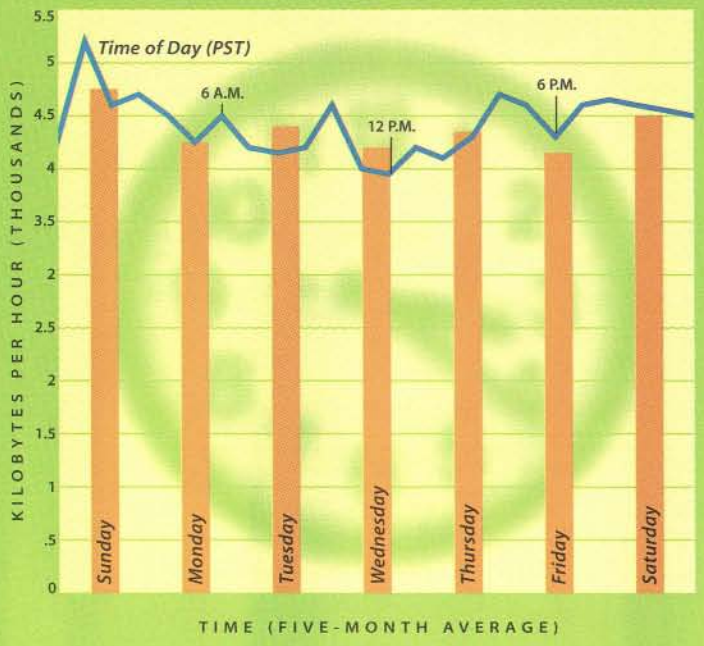
## Accessing the Web

**While pundits predict a systemwide Internet crash, Web access times remain stable. Delays during file downloads stem mainly from bit-heavy Web pages and underpowered servers – not Net gridlock. The Net's backbone is still fast enough to route the flow of information. As long as infrastructure investment keeps pace with data traffic growth, we can sleep peacefully.**

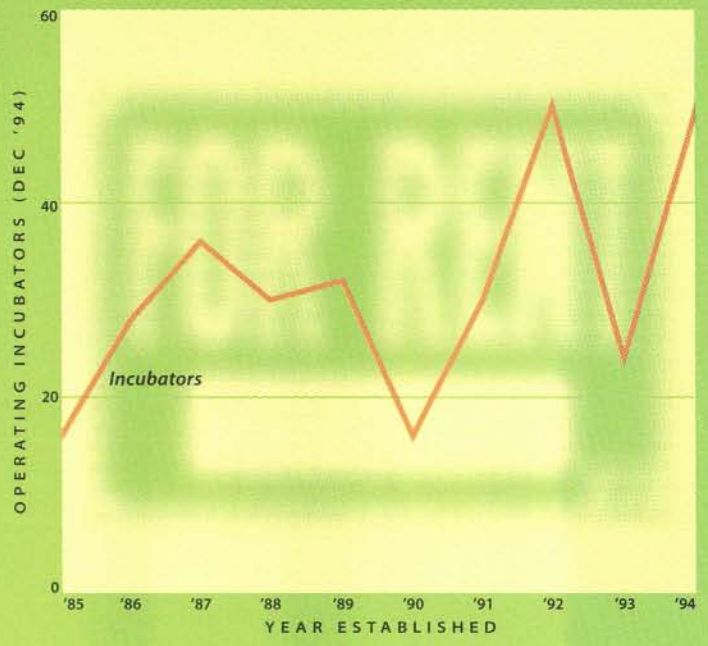
SOURCE: TIMEDANCER SYSTEMS, *(WWW.TIMEDANCER.COM/BETA/)*




## Business Incubators

**Providing cash-starved start-up companies with cheap real estate, office equipment, and other services seems like a great idea, but it's not as easy as it looks. In the last few years, incubator development in the US and Canada has stabilized at around 500 programs as funding problems and the shifting priorities of incubator developers countered new growth.**

SOURCE: NATIONAL BUSINESS INCUBATION ASSOCIATION

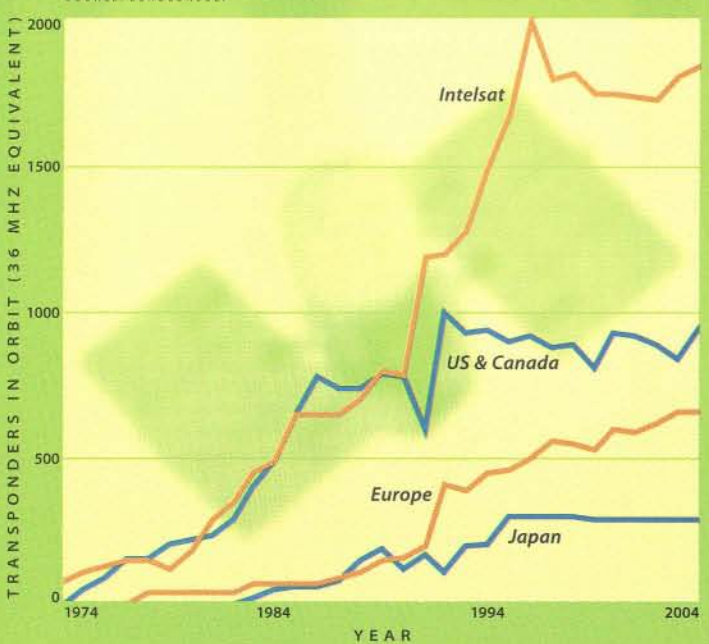



Edited by Tim Barkow

## Satellite Telecommunications Capacity

**Technology moves much faster than you can launch a rocket. Satellite orders in the late 1980s and early 1990s will push transmission capacity up after 2000, though current communications investment has already turned to land-based fiber solutions. Continued growth in satellite TV and PCS should fill the new bandwidth, but the skies may finally be saturated.**

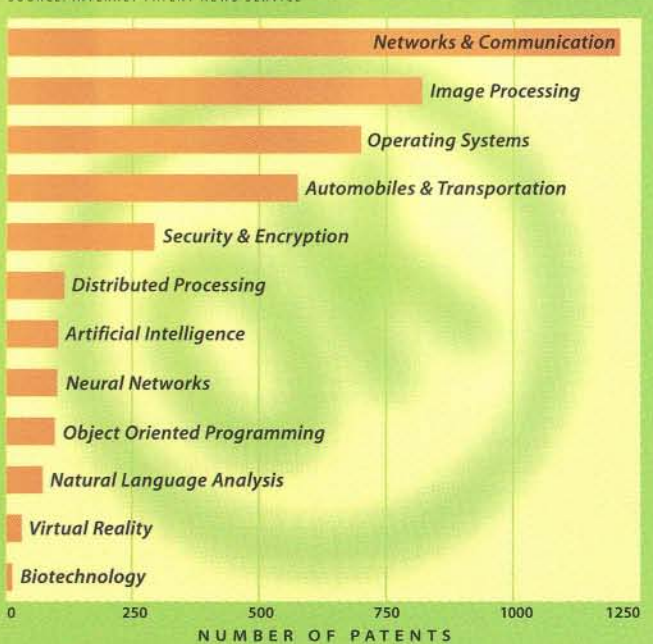
SOURCE: EUROCONSULT

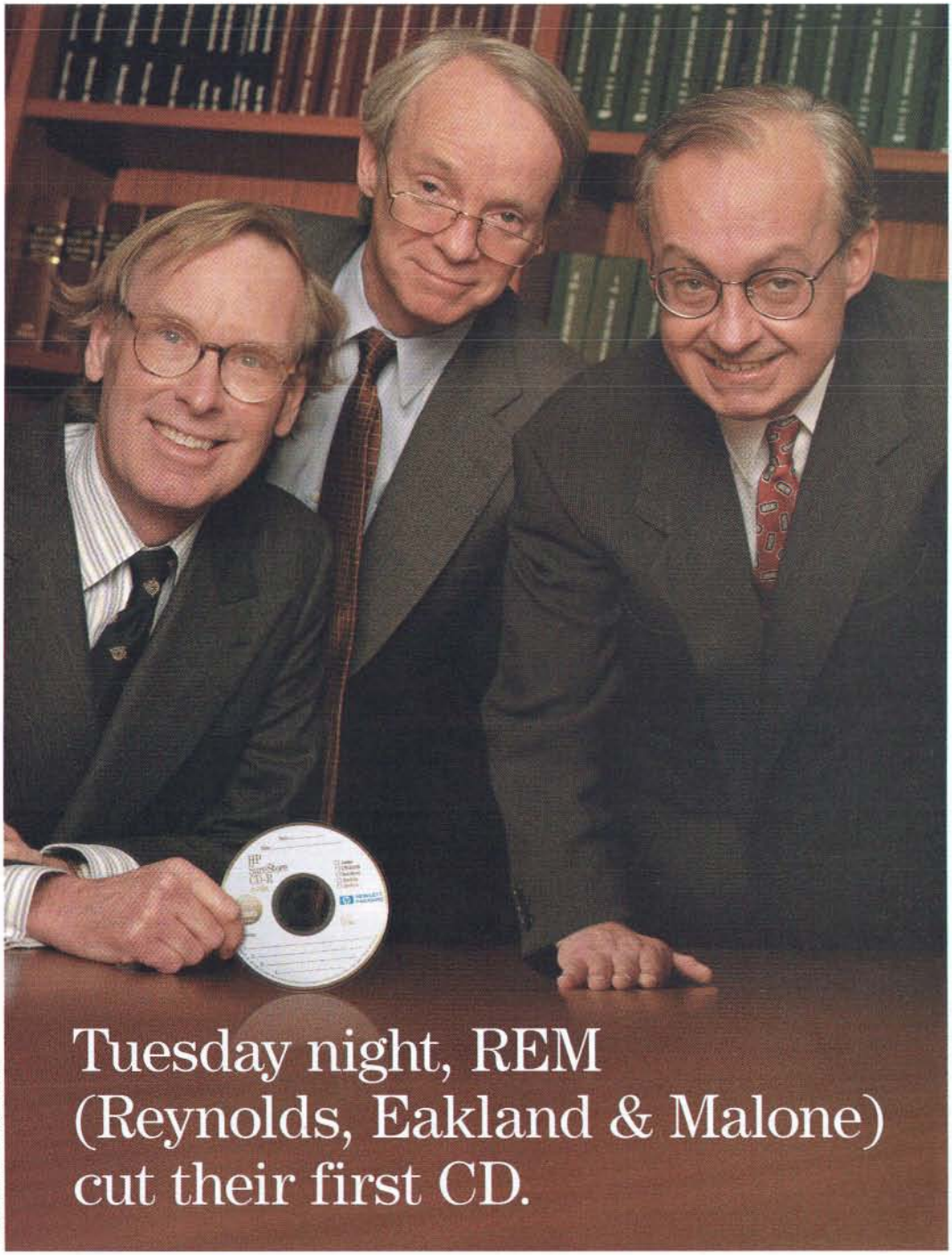



## US Software Patenting

**Looking for the latest software niche to invest in? Tracking software patenting provides a glimpse of what the tinkerers have been tinkering on. In 1995, networking and security were hot, while biotech and virtual reality were not. Unfortunately, the US Patent Office is still ill equipped to examine software patent applications, and many of them are likely to be disallowed.**

SOURCE: INTERNET PATENT NEWS SERVICE






# Tuesday night, REM (Reynolds, Eakland & Malone) cut their first CD.

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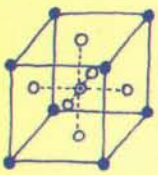
# Giant Magnetoresistance

## When big hard drives aren't big enough.

By Katherine Derbyshire

Full-motion video. Stereo sound. Leading-edge multimedia applications eat disk space for lunch. In 1985, 10-Mbyte hard drives were objects of lust and desire. Now, even 1-Gbyte drives are too small. To keep up, builders of hard drives are searching for ways to cram more bits into less space. The most likely near-term solution is giant magnetoresistance (GMR). It relies on familiar magnetic media, yet promises to boost storage densities from today's 700 Mbits per square inch to the 5-10 Gbits needed by the turn of the century.

The lanthanum manganite unit cell:



KEY

- ● = $La^{3+}$, $Ca^{2+}$, ...
- ○ = $Mn^{3+}$, $Mn^{4+}$
- ⊙ = $O^{2-}$

Colossal magnetoresistive materials, such as lanthanum manganite ($LaMnO_3$), require careful control of composition. Calcium can easily substitute for lanthanum, changing the material's properties.

Conventional hard drives depend on the close relationship between electricity and magnetism. The read/write head of a drive is a coil of wire. If electrical current is sent through the coil, it creates a magnetic field. A magnet moving across the coil, conversely, creates a current in the wire – and the amount of current depends on how fast the magnet moves. This relationship between magnetism and electrical current, called induction, makes electrical motors – and today's magnetic storage devices – work.

Floppy drives are a simple example of magnetic storage. The floppy itself is a sheet of plastic with millions of tiny metal shards stuck to its surface. The drive spins the disk while two very small wire coils, called heads, rest on the top and bottom surfaces. A hard drive works on the same principle but has several "platters" of rigid media instead of a single floppy, with at least one head for each side of each platter. Since hard drives retrieve data faster, the platters must spin faster. To avoid damage, the heads hover on a skin of air just microns thick, not touching the platter.

To write data to the disk, a drive sends current through one of the coils, switching it on and off to represent the 1s and 0s of the data stream. The magnetic field induced by the current pulls the magnets on the surface of the disk into alignment, storing the data bits. The same process in reverse reads the data back: as the disk spins, the movement of the tiny magnets induces a current in the head. The drive interprets changes in the induced current as a stream of binary 1s and 0s.

This is where the problems begin. As storage densities increase, the magnetic region that represents each bit becomes smaller and harder to detect. Writing these tiny magnetic regions can still be done with a conventional write coil, but reading them is much more demanding. The read coil must be positioned closer to the disk and must be wrapped tighter, with more turns. The smaller the spacing between the disk and the head, the more difficult it is to maintain. That's bad: Contact between the head and the disk can destroy both the drive and the stored information. Coils with many turns also dissipate more energy. The lost current is converted into heat, which adds electrical noise and makes the data signal difficult to interpret. After a point, adding more turns doesn't improve sensitivity.

To get around these problems, scientists at IBM have been studying an effect called magnetoresistance (MR) since the mid '70s. Magnetoresistive materials have one very special property: When exposed to a magnetic field, they have less resistance to electrical current. So if you put a voltmeter across a disk head made of MR material, the fluctuations in voltage that the meter shows will reflect the magnetic values stored on the disk. By directly detecting the magnetic field, rather than measuring the change in field as inductive heads do, MR heads gain two advantages. First, they can detect smaller magnetic signals. Second, they don't face the problems with small spacings and thermal noise that currently plague inductive heads.

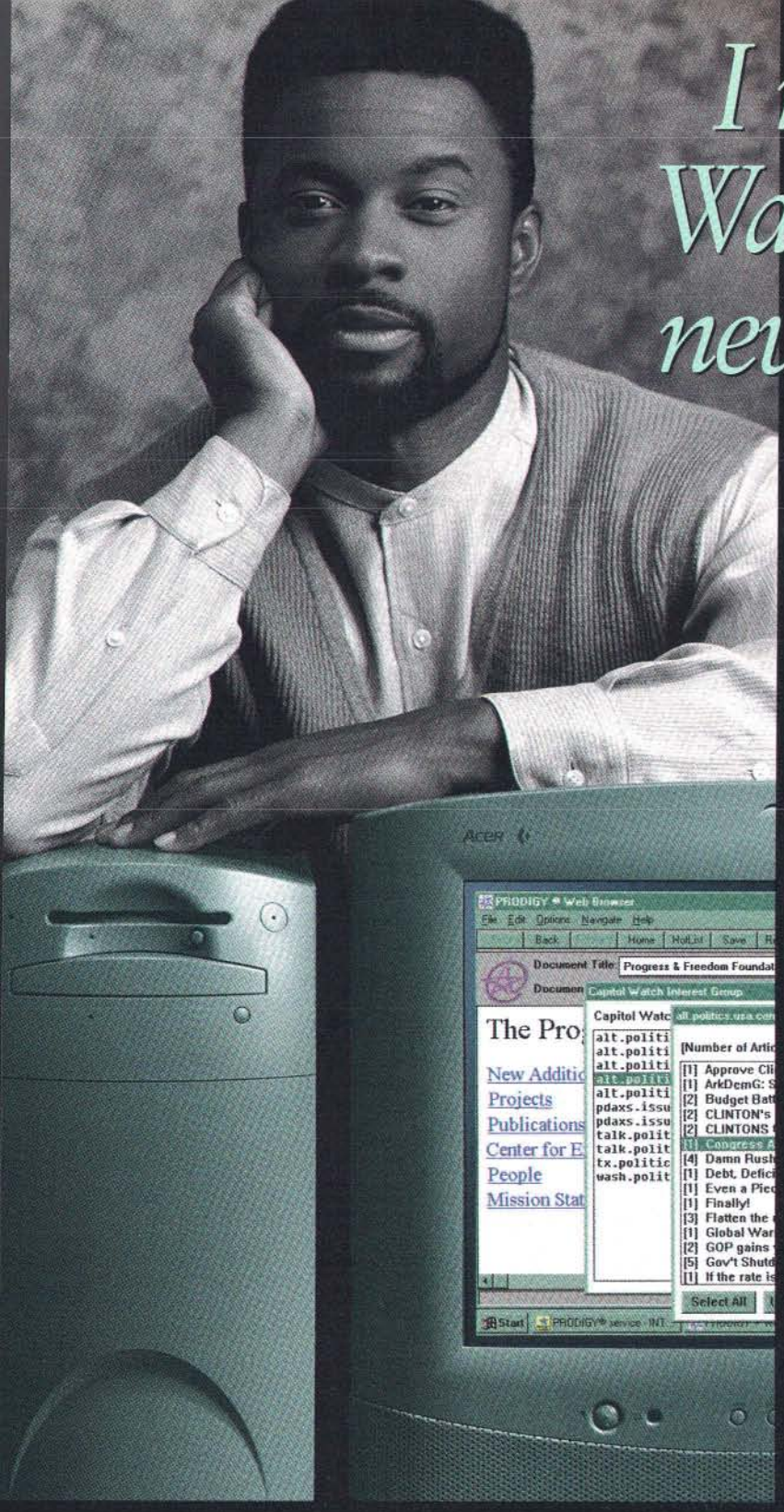
The simplest magnetoresistive material to make is anisotropic MR. The resistance of an AMR layer depends not only on the presence of a magnetic field but also on the relative orientations (parallel or antiparallel) of the material and the magnets. As the platter rotates past an AMR head, the orientation of the magnets changes, and the resulting resistance change of about 2 percent is interpreted as data. For storage densities in the 1-Gbit-per-square-inch range, AMR heads can achieve sensitivities five times greater than inductive heads. Still, 10-Gbit storage requires further advances.

Giant magnetoresistance, the next step, is more complicated. In GMR heads, two magnetic layers are separated by a layer of nonmagnetic material that is much thinner than that of an AMR head. Like two bar magnets, the magnetic layers are forced to more parallel, or more antiparallel positions, by an applied magnetic field. This change in angle affects the head's sensitivity. Today's prototype GMR read heads have twice the MR effect of an AMR head (resistance changes by about 4 percent), and scientists believe future versions will offer an order-of-magnitude advantage. GMR structures are difficult to manufacture, though. They're made from layers a mere 10 atoms or so thick. Contamination of the thin layers by oxygen or water vapor, or exposure to stray magnetic fields during processing, can seriously degrade the material's MR properties.

After GMR, the prospects are murky. The next level, colossal magnetoresistance, is a decade or more away from commercial production. In CMR, alternating atomic planes within a single crystal act as magnetic layers. A much more substantial MR effect occurs, thousands of times greater than seen in GMR, but CMR materials are even more difficult to make reliably. If excess oxygen is incorporated into the crystal, the spacing between planes will change, and the CMR effect will be lost. The CMR effect also requires very large applied magnetic fields and cryogenic temperatures. These hurdles must be overcome before the material will be practical for disk drives.

What does the future hold? According to some industry analysts, AMR heads are three times as expensive as inductive heads, so they aren't likely to gain a large share of the market until – at about 3 Gbits per square inch – inductive heads just can't compete. Once hard drives that use AMR heads become popular, integration of GMR heads (by 2000 or so) should be a relatively straightforward matter. And with 10-Gbit storage density, these drives should be able to handle whatever programmers throw at us. Even Windows 2001. ■ ■ ■

*Katherine Derbyshire* (kewms@kew.com) *is executive editor of* Solid State Technology *magazine* (www.solid-state.com).

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# Short on ISPs, Long on Tech Funds

**By Michael Murphy**

After the first blind-faith flurries in which any IPO with the word *net* in its name could go public and double or triple the first day, a more Net-savvy Wall Street is learning to segment Internet stocks. Net hardware makers and companies giving away infrastructure software still earn sky-high market values even if sales and earnings are nonexistent. But for providers of Internet access, the game is over. (Oddly, Wall Street still accepts AOL's contention that its wheat is somehow different.)

None of the three sinking ISPs is making any money, and they don't enjoy the upside of a Netscape. With very cheap Internet access provided by the big boys – I didn't pull that $2.95 figure out of a hat – there's no telling how long it will take before these companies creep into the black. I'm not holding my breath. I am holding the Netcom short position in TWIT$.

**The Wired Interactive Technology Fund (TWIT$)**

| Company | Primary Business | Symbol | Shares | Price Mar 1 | Δ Since Feb 1 | Action |
|---|---|---|---|---|---|---|
| Mobile Telecommunications Technologies Corp. | Mobile computing | MTEL | 5,000 | 13 ½ | – 3 ½ | sell |
| Netcom On-Line Communication Services Inc. | Internet provider | NETC | 15,000 | 24 ½ | – 4 | cover 10,000 |
| General Magic Inc. | PDA sw | GMGC | 4,500 | 6 ¼ | – 3 ⅛ | cover |
| Sun Microsystems Inc. | Hw/sw | SUNW | 7,300 | 49 | + 3 ⅛ | sell 4,300 |
| 3Com Corporation | Networking | COMS | 3,800 | 46 ⅜ | 0 | sell |
| LSI Logic Corporation | Semiconductors | LSI | 7,800 | 25 ¼ | – 6 ⅛ | hold |
| Applied Materials Inc. | Semiconductor equip. | AMAT | 4,000 | 34 ¼ | – 5 ⅛ | hold |
| The Walt Disney Company | Entertainment | DIS | 1,500 | 66 | + 3 ⅛ | hold |
| Apple Computer Company | Hw/sw | AAPL | 4,800 | 26 ⅞ | – 1 ½ | hold |
| Time Warner Inc. | Mass media | TWX | 2,600 | 43 ⅜ | + 2 | sell |
| Tele-Communications Inc. | Cable television | TCOMA | 4,800 | 21 | – ¼ | hold |
| Macromedia Inc. | Multimedia sw | MACR | 1,900 | 40 ½ | + 2 | sell |
| Cisco Systems Inc. | Interconnectivity | CSCO | 2,600 | 45 ½ | 2:1 split | sell |
| C-Cube Microsystems | Video chips | CUBE | 1,700 | 66 ¼ | + 6 ⅞ | sell |
| **New Stocks** | | | | | | |
| Intel Corporation | Microprocessors | INTC | 3,000 | 56 1/16 | | buy |
| Adobe Systems Inc. | Software | ADBE | 5,000 | 32 ⅛ | | buy |
| **Portfolio Value** | $1,755,831.25 | (+75.58% overall) | | | + 1.93% | |

*CSCO stock split February 2; up 6.12% since February 1.

Legend: This fund started with US$1 million on December 1, 1994. We are trading on a monthly basis, so profits and losses will be reflected monthly, with profits reinvested in the fund or in new stocks.

TWIT$ is a model established by *Wired*, not an officially traded portfolio. Michael Murphy is a professional money manager who may have a personal interest in stocks listed in TWIT$ or mentioned in this column. *Wired* readers who use this information for investment decisions do so at their own risk.

(Unless you are America Online and can convince Wall Street there's some long-term value in providing Internet access for US$2.95 an hour instead of $2.95 a month!)

Consider the stock prices of Netcom, PSINet (formerly Performance Systems), and UUNet. (See the table at *www.wired.com/ftm/*.) To Wall Street, these Internet companies have about as much proprietary value as a crop of wheat, and some mighty big corporate farmers like AT&T, MCI, and the RBOCs are bringing their economies of scale onto the field.

## Tech Mutual Funds

Cheap steel drove the economy in the decades preceding World War I. Then came cheap oil, and fantastic riches grew out of autos, fuel, and highways. Today, of course, the economic driver is cheap semiconductors, and new fortunes are being made in computers, software, communications, and biotechnology. Investing alongside the entrepreneurs of the new economy is a logical route to substantial profits and offers a good chance of beating the market averages.

So why do less than 10 percent of investment analysts follow technology? Why do only 30 of the approximately 7,150 mutual funds specialize in science and technology? Wall Street would rather follow stocks it knows in industries it has followed for decades than learn something new.

Nevertheless, tech funds drew a lot of attention in 1995. They soared through the first three quarters before their much-publicized pratfall in the December quarter. Disappointing sales of Windows 95 left too many computers, peripherals, and semiconductors on the shelves, so companies were forced to cut prices and sacrifice profits to liquidate the inventory. After a slow start in 1996, accelerating sales of Pentium-class personal computers should spark another good year for tech funds. By 2000, these funds should rack up a record just as good as the previous five years', when they averaged 28.5 percent annually.

Technology funds aren't a bad place to invest some (or all) of your long-range investments, such as your 401(k) or Keogh money. They could represent a chunk of your mad money, too.

I recommend eight funds based on their past performance and my analysis of each fund's portfolio relative to the sectors of the market I think will do well during the next year or so. (I modestly exclude the technology fund that I advise.)

My preference is funds with managers who are committed to invest in technology as the main driver of the new economy. Rather than evaluating annual performance in isolation, I'm focusing on a fund's activity during turning points and market swings to answer specific questions: How did it do in the bad market before the Persian Gulf War? And in the tricky 1994 market? This is an unconventional way to analyze performance, but it provides useful insights into what is driving a fund manager's results. Consider the average annual return for the five years since the last major market downturn, how the fund performed in the first three quarters of 1995, and how the fund weathered the tech drop in the last quarter of '95. The table shows the results.

**Tech Funds to Watch**

| Fund | CAGR* 1991-'95 | Q1-3 '95 | Q4 '95 |
|---|---|---|---|
| Alliance Technology | 32.3% | 53.3% | – 6.1% |
| Fidelity Select Developing Communications | 27.5% | 36.4% | –14.0% |
| Fidelity Select Software & Computer | 30.9% | 44.3% | 1.2% |
| G.T. Global Telecommunications | NA | 13.7% | – 4.5% |
| T. Rowe Price Science & Technology | 33.6% | 52.7% | 1.9% |
| Seligman Communications & Information | 37.0% | 67.6% | –14.4% |
| Smith Barney Telecommunications Growth | 14.8% | 15.4% | – 5.9% |
| United Science & Technology | 23.2% | 49.8% | 3.8% |

*Compound Annual Growth Rate

## TWIT$

This month, I'm selling the remaining Mobile Telecommunications Technologies stock and taking profits in Macromedia, Cisco Systems, and C-Cube Microsystems. I'll also cover the General Magic short, and trim both our Sun Microsystems and Netcom holdings. I'm trading Time Warner for 1,700 shares of Intel and using 3Com as a source of funds for 6,000 shares of Adobe Systems. Adobe invented PostScript and Acrobat, publishes Web software, and has become the third-largest PC software company by *not* going head-to-head with Microsoft. The stock has dropped in half over the last few months. ■ ■ ■

*Michael Murphy is a money manager who publishes the* California Technology Stock Letter *in Half Moon Bay, California.*

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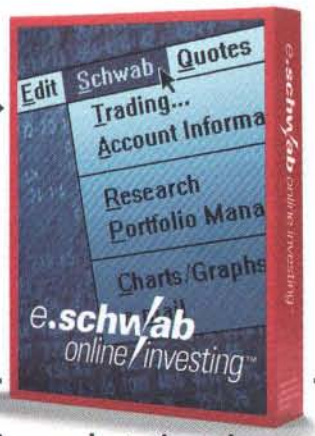


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# @d:tech.new orleans

It's June. Mardi Gras is long over. But @d:tech.96 conference attendees will find that there is more to New Orleans than the flamboyant, Dionysian festival the city is famous for. Spread along the banks of the muddy Mississippi, New Orleans combines the traditions of the deep South and the elegant culture of Europe with traces of voodoo spirits and gritty, soulful jazz.

Start your day with a square meal of beignets and café au lait at **Café du Monde**. No one will seat you, so walk past the line of tourists and shark around for a table. **The Camellia Grill**, a classy diner in the Garden District, serves good ol' Southern grits and great omelets. (A caffeine caveat: coffee served in New Orleans is often cut with chicory, which gives it a strong kick. Even full-blooded Cajuns don't drink their coffee black.)

At lunchtime, swing past the **Progress Grocery Co.**, a French Quarter grocery and deli that makes the best muffuletta – or muff, as this massive round of Italian bread stuffed with ham, salami, provolone, mortadella, and olive salad is known. Walk down to Jackson Square for a picnic in the heart of the bustling quarter.

If you'd rather, beat the heat with a peach nectar snowball at **Hansen's Sno Bliz** on Tchoupitoulas (pronounced "chop-i-too-luh"). Or duck into the cool, dark **Lafitte's Blacksmith Shop** on Bourbon. According to legend (and New Orleans drips with legend), Jean Lafitte and his pirate pals opened this foundry in 1772 as a front for their contraband activities. Order a round of hurricanes and imagine the raucous history of this decrepit building.

Richard Rochester's infamous walking tour of the **French Quarter** is a must: it begins outside Lafitte's every night at 8. An imposing figure dressed in black, Richard winds through the dark streets of the Vieux Carré spinning truths and tales.

Whether or not you believe his story about the historic **Napoleon House**, it's a relaxing spot for dinner or for drinks. Another supper option is **Coop's** – order a plate of boiled crawfish, and don't forget to suck the heads.

After *le repas*, find yourself a folding chair at **Snug Harbor**, a teeny jazz club with infinite appeal in Faubourg Marigny. Charmaine Neville (the daughter) and Ellis Marsalis (the father) often take the stage here. If the Harbor is a little too snug, samba over to the nearby **Café Brasil** to hear the Iguanas or The New Orleans Klezmer All-Stars, two great local bands. Other jazz clubs include **Tipitina's,** within walking distance, and **The Maple Leaf Bar** or **Jimmy's** uptown.

Before you leave the city, stop in at the **Louisiana Music Factory** – this Valhalla for the weary record collector carries hot jazz, zydeco, Cajun, and more. And visit **F&H Botanica** for all your spiritual needs and tourist trinkets.

The @d:tech.96 conference is sure to be interesting. But then again, this is New Orleans, where you can singe your tongue on jambalaya at **The Praline Connection** or swallow hurricanes while the zydeco band plays on and on. So just do it. – *Jessie Scanlon*

*Muffulettas of thanks to Jill Robinson, Susanne Scovern, and webgods Chuck Taggart and Ed Branley.*

PHOTO: DOUGLAS ADESKO

**The Current Roundup** (see *Wired* 4.04)
**May 6-11** Fifth International World Wide Web Conference; Paris. **May 16-18** Artificial Life V; Nara, Japan. • **May 16-18** E3: The Electronic Entertainment Expo; Los Angeles. • **May 30-June 1** Workshop on Information Hiding; Cambridge, England. • **June 6-9** 5Cyberconf: Fifth International Conference on Cyberspace; Madrid.

**June 16-20 Society and the Future of Computing '96; Snowbird, Utah** Organized by Los Alamos National Lab, this second-time forum for academics, policymakers, and commercial developers aims to push computer science research in directions that truly benefit society. Lectures and panel discussions will focus on computing as it relates to work, culture, identity, and democracy. Registration: US$395 through May 1, $495 after. Students $125 through May 1, $150 after. Contact: email *sfc96@lanl.gov*, on the Web at *www.lanl.gov/SFC/96*.

**June 17-19 @d:tech. 96; New Orleans** In the advertising business, the medium, the message, and even the market are changing. The bevy of speakers at this first-time event includes Marty Levin of Microsoft Network and Martin Nisenholtz of *The New York Times*; they'll discuss the effect of technology on advertising and marketing in the 21st century. Registration: US$1,395 for full conference pass; other passes available. Contact: (800) 535 1812, +1 (804) 643 8375, email *skip@ad-tech.com*, on the Web at *www.ad-tech.com*.

**June 23-26 Global Super Projects Conference; San Francisco** Sponsored by the World Development Council, this fifth annual event focuses on the global city-states of the future. Several hundred futurists, engineers, commercial developers, and politicians will attend sessions devoted to projects that promote international links, help the environment, and boost economic development. Registration: US$1,250 for entire conference or $500 per day. The full conference academic rate is $500. Contact: +1 (770) 446 6996, email *wdc@conway.com*, on the Web at *www.conway.com*.

**June 25-28 INET'96: The Internet: Transforming our Society Now; Montreal** The sixth annual conference of the Internet Society goes global with an emphasis on the social, cultural, economic, and linguistic implications of networking around the world. Topics range from the nuts and bolts of networking protocols and services to the growing pains of the Internet and related social transformations. Registration: US$475. Contact: +1 (703) 648 9888, fax +1 (703) 648 9887, email *inet96@isoc.org*, on the Web at *www.isoc.org/conferences/inet96*.

**July 11-13 Vision Plus 2; Schwarzenberg, Austria** In its second year, this design event is organized by the International Institute for Information Design and sponsored by UNESCO. The program, chaired by design god Erik Spiekermann, will focus on "Seeing, Feeling, Understanding: Controversial Views on Developments in Communication," with participants from academia, the design community, and the high-tech industry. Registration: US$50, students $25. Contact: +43 1 4036662, email *ps.id@magnet.at*.

**Out on the Range:**
**July 14-18** FutureVision: Ideas, Insights, and Strategies; Washington, DC. Contact: (800) 989 8274, fax +1 (301) 951 0394. • **July 26-28** DefCon IV; Las Vegas. Contact: email *dtangent@defcon.org*, on the Web at *www.defcon.org*. **July 28-30** Spotlight; Laguna Niguel, California. Contact: (800) 633 4312, +1 (415) 312 0545, fax +1 (415) 286 2750.

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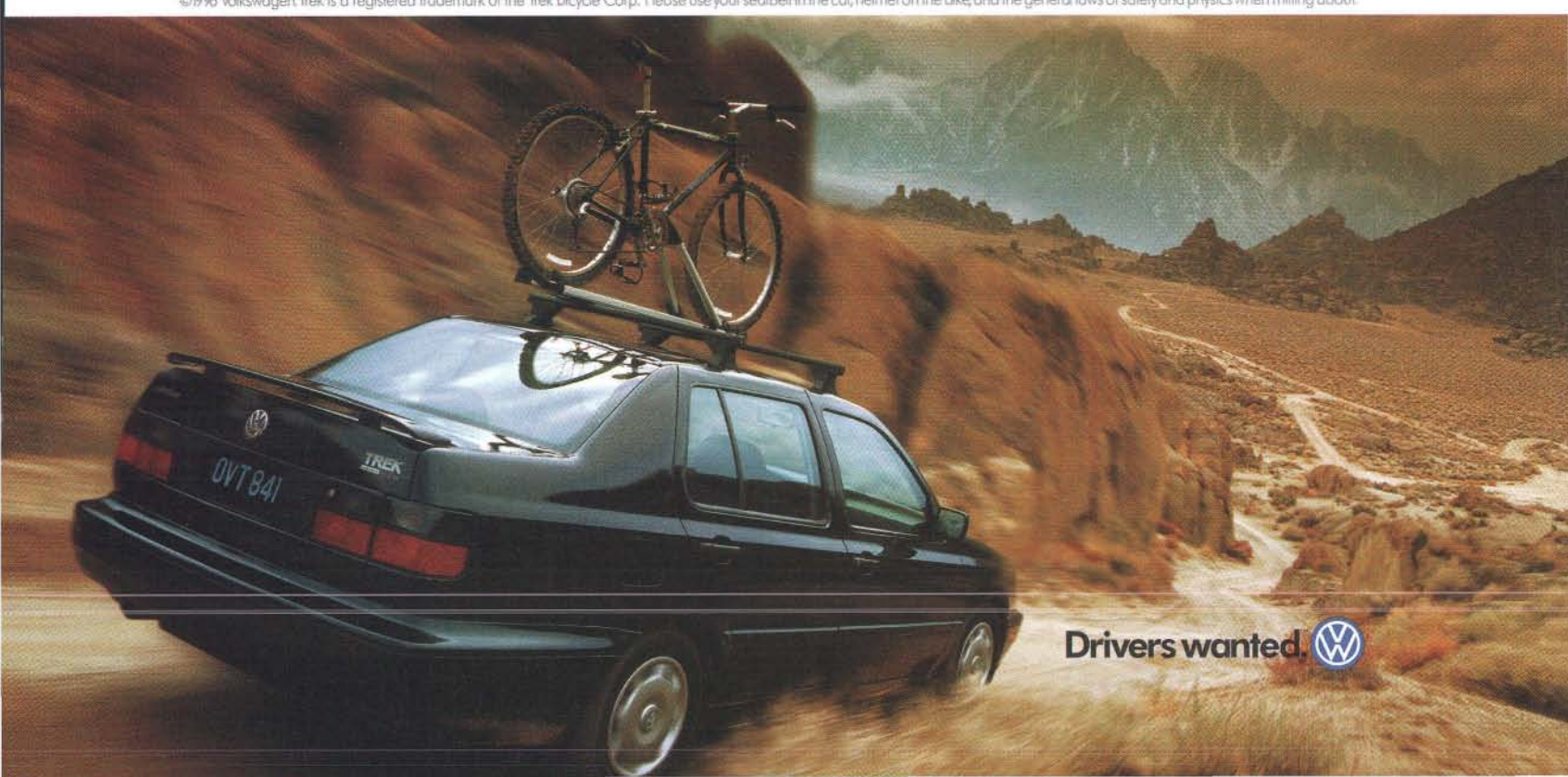

# Viacom Sucks It Up

It wasn't performance, profit margins, or even clashing personalities that led Viacom chair Sumner Redstone to summarily fire his president and CEO, Frank Biondi, this past January. At least, it wasn't Biondi's personality. But it may well have been Redstone's. "Sumner just wants to run the company, and he doesn't want anyone in his way," says one Viacom insider familiar with how the firing went down. "Frank was in his way."

No more. The 72-year-old Redstone – now Viacom's chair and CEO – has consolidated his power utterly, leading many to compare his new role to the autocratic leadership style of the 65-year-old Rupert Murdoch, scion of News Corp.

It's a comparison Redstone would not necessarily reject. In fact, Redstone has publicly praised his competitor, a man who, among other savvy moves, has created a broadcast network rife with fare like *90210* and *Melrose Place*. Who loses when Fox owns the youth market with trendy programming? Seen any good episodes of *The Grind* lately, Mr. Redstone?

With the acquisitions of Blockbuster and Paramount still heavy in its belly, Viacom can ill afford to lie python-like in the sun and let the digestion process take its course. And it's hard to sprint on a full stomach. But now that the company is in the biggest of the media big leagues, it has to run with the Time Warners and News Corps of the world.

According to insiders, Biondi, widely praised for his financial acumen and for being "a really nice guy," was not moving quickly enough for Redstone, the itinerant entrepreneur. Redstone knew that if Murdoch sneezed, News Corp. could purchase a cold-remedy firm a nanosecond later. The Viacom chief not only craved that kind of executive power, he understood it was necessary to direct a sprawling media empire. Biondi, it seemed, had to go.

As we reported a year ago, the new Viacom is nothing if not a brand powerhouse, with Blockbuster, MTV, Simon & Schuster, *Star Trek*, and countless other sheep in its megafold. But Viacom is still the new kid on the block, and it is still unofficially organized by medium: television networks, new media, motion pictures, publishing. According to many within the company, the elusive synergy – in which a brand can be cross-sold in various media – came too slowly for Redstone. "Redstone sees what Disney does with a brand," says one analyst, "where the bottom line shoots up with *Pocahontas* tapes, books, merchandise, albums, and games. He wants more of that synergy at Viacom."

Meanwhile, Biondi had let one of Redstone's favorite executives, MTV vice chair (and former Nickelodeon president) Geraldine Laybourne, accept an offer to run Disney/ABC Cable Networks's entire cable plant.

While it's not clear that the loss of Biondi translates into a fleeter Viacom, it's clear that his departure, and Laybourne's resignation, has put the company on notice: things are going to change around here, and everyone will be much more accountable. "It's sad to see Biondi go," says one insider. "But we simply have too much work to do to worry about what it all means." Exactly the message, we'd wager, that Redstone wanted to send. – *John Battelle*

[ORIGINAL STORY IN *WIRED* 3.04, PAGE 110.]

### Vegas Nerds

Under a starry desert sky in January, Paramount Parks and Hilton Hotels broke ground on the first-ever *Star Trek* theme-park attraction ... in Las Vegas. Among those beamed onto a larger-than-life stage were Commander Will Riker (Jonathan Frakes) and Dr. Beverly Crusher (Gates McFadden), who directed phaser fire at the spot where the US$50-odd million attraction will stand next spring. Meanwhile, the 3,000-room Las Vegas Hilton will be adding a 65,000-square-foot space station to the hotel.

According to Tim Fischer, executive VP and general manager of Paramount Parks, Vegas offered the perfect coordinates for this venture, given the mecca's surreal ambience and 30 million pilgrims per annum. Watch out, Disneyland: there's a new entity in scanner range. And it'll be docking at *DS9* next year.

[ORIGINAL STORY IN *WIRED* 4.01, PAGE 154.]

### I-Rations

Shortly after US Army units rolled into Bosnia, Pentagon officials announced that the peacekeepers would have Internet access – "I-rations." American citizens were urged to send generic electronic greetings to the troops via an email address established as part of the Defense Department's BosniaLINK homepage at *www.dtic.dla.mil/bosnia/*. (Email could not be addressed to specific individuals or units.)

A smattering of the "any soldier" messages were to be distributed through military print and broadcast media in Bosnia and surrounding regions, and also posted on BosniaLINK. As *Wired* went to press, however, a DOD spokesperson said the extent of email use among the 16,500 US troops was less than hoped for, due to severe technological limitations (such as Tuzla's few, poor-quality phone lines and remote troop locations). Iridium, anyone?

[ORIGINAL STORY IN *WIRED* 1.1, PAGE 46.]

### Sold!

*Encyclopaedia Britannica*'s newest owner, Jacob Safra, heralded his purchase as the "crown jewel of accumulated knowledge." The European financier declared that his goal in buying the company from the William Benton Foundation was to distribute the age-old resource – an icon of print publications – to "all people, of all incomes, and all ages," a statement that hints at wide accessibility.

But two months after the sale, Britannica refuses to elaborate on the details of these bold plans.

The University of Chicago, which has backed the ailing Britannica in recent years, received an undisclosed amount from the January sale. (*The New York Times* reported that Britannica could fetch up to US$500 million, a figure the company declined to confirm.) In October of last year, Britannica unveiled a Web site *(www.eb.com/)* as its primary digital interface. The site charges a $150 subscription fee to individuals and so far has sold 300 pricier site licenses to US colleges and universities. For those with richer blood, the publishing concern is also hawking a CD-ROM, retailing for $995.

The January sale followed the August '95 closing of two-thirds of the publisher's North American sales offices.

[ORIGINAL STORY IN *WIRED* 3.08, PAGE 72.]

IMAGES: VIACOM: COLLAGE BY JOHN PLUNKETT/MTV/SHOOTING STAR; I-RATIONS: LORAL CORP.; VEGAS NERDS: PARAMOUNT PICTURES/ROBBIE ROBINSON

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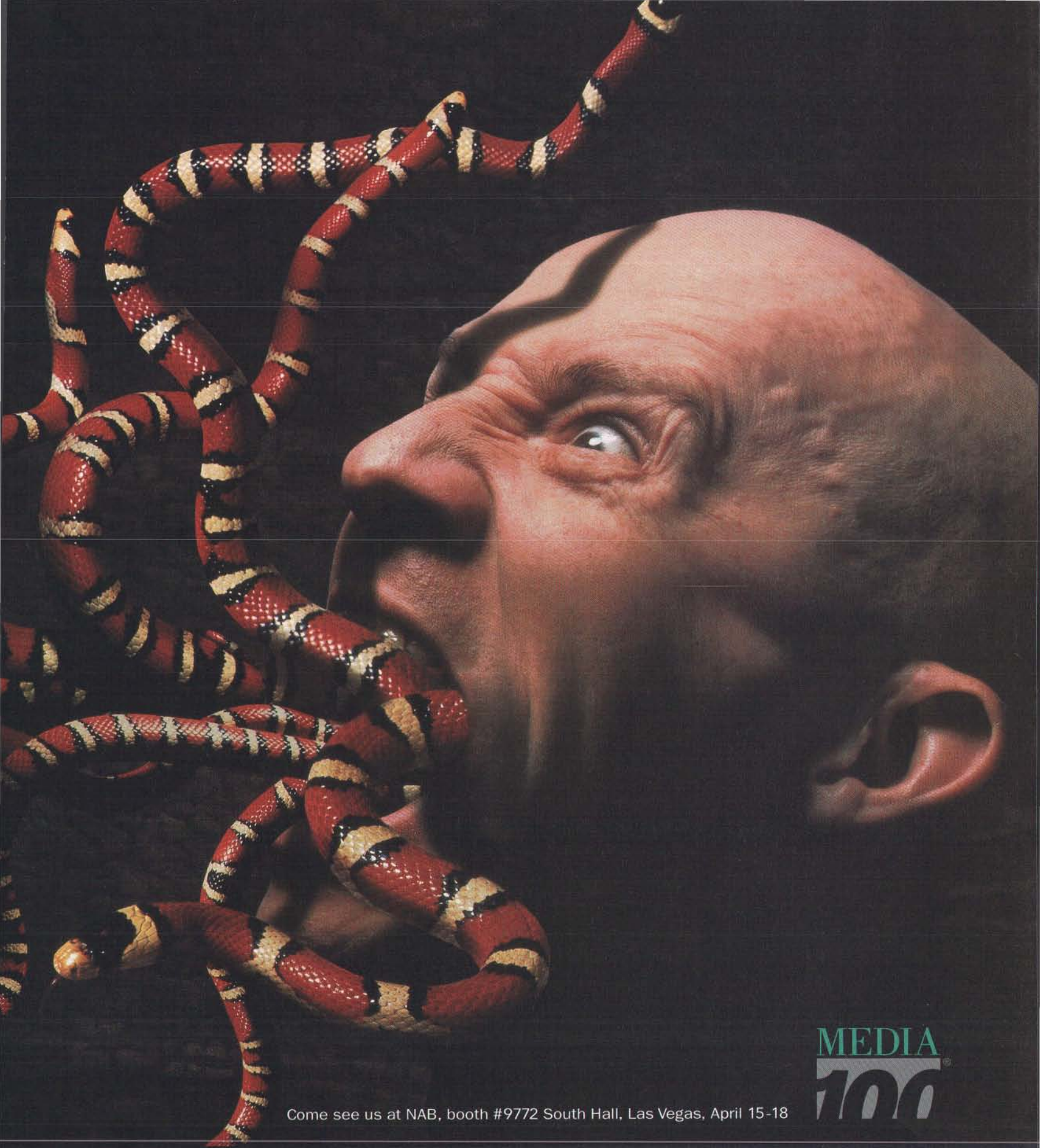


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WHAT DID YOU HAVE IN MIND?™

# Internet v. United States Department of Justice, Janet Reno, et al.

**In our lawsuit challenge to the Communications Decency Act, an unprecedented coalition of Internet service providers, software manufacturers, media outlets, public-interest groups, and individual users have joined together to protect the Net from censorship. Here are excerpts of the brief.**

www.wired.com/4.05/crn/

*A specter is haunting cyberspace – the specter of government censorship. All the powers of old Washington have entered into an unholy alliance to gut the First Amendment: the House of Representatives, the Senate, and President Bill Clinton. The weapon they have seized is called the Communications Decency Act, and the long-term implications of this legislation are monumental. At stake is nothing less than the survival of free speech in the 21st century.*

*The sanctimonious champions of the Communications Decency Act have argued that the legislation seeks to protect children from exposure to pornography. But in reality, their agenda is far more broad and far more insidious. The Communications Decency Act criminalizes the transmission, posting, and distribution of "indecent" material to the World Wide Web, ftp sites, Usenet newsgroups, and BBSes. Private email and online chat-room communications exchanged with anyone under 18 years of age are covered by identical provisions. Those convicted of violating the act may be punished with US$250,000 fines and two-year prison terms.*

*Although "indecent" speech sounds menacing, it is hardly synonymous with pornography. In practical terms, this legislation criminalizes the electronic publication of four-letter words, AIDS education information, and countless classic works of literature and art.*

*To combat this injustice, an unprecedented roster of forward-thinking Internet service providers, software manufacturers, media outlets, public-interest groups, and individual Net users have joined under the banner of the Citizens Internet Empowerment Coalition (CIEC) to challenge the provisions of the Communications Decency Act in court and purge this legislation from the law books.* Wired *magazine, as well as our sister Web site,* HotWired, *are proud to have joined as co-plaintiffs in this milestone legal action.*

*On February 27, 1996, lawyers representing CIEC filed a 17,000-word complaint in a federal courthouse in Philadelphia. In essence, this document is a manifesto for free speech in the digital age, and it is in that spirit that we are reprinting portions of it here. In the months ahead, we expect the US Supreme Court to take up our challenge.* – Todd Lappin

**Preliminary statement**

During much of this century the mass media, particularly radio and television, have been characterized by a limited number of speakers transmitting programming and information to essentially passive audiences. The communications medium of the 21st century – the Internet and "cyberspace" generally – is changing that, and will allow hundreds of millions of individuals to engage in interactive communication, on a national and global scale never before possible. The public square of the past – with pamphleteering, soapboxes, and vigorous debate – is being replaced by the Internet, which enables average citizens to participate in national discourse, publish a newspaper, distribute an electronic pamphlet to the world, and generally communicate to and with a broader audience than ever before possible. It also enables average citizens to gain access to a vast and literally worldwide range of information, while simultaneously protecting their privacy, because in this new medium individuals receive only the communications they affirmatively request.

In enacting the Communications Decency Act of 1996, Congress acknowledged that the Internet represents "an extraordinary advance in the availability of educational and informational resources to our citizens," and acknowledged that interactive computer services "offer users a great degree of control over the information that they receive." Congress therefore declared "[it] is the policy of the United States ... to promote the continued development of the Internet and other interactive computer services; [and] to preserve the vibrant and competitive free market that presently exists for the Internet and other interactive computer services, unfettered by federal or state regulation."

Unfortunately, as we will show, provisions of the

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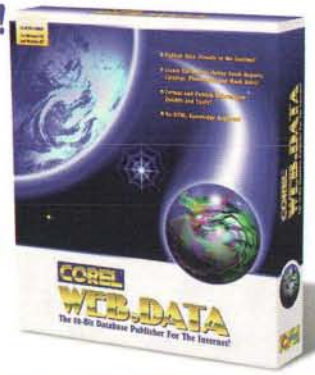


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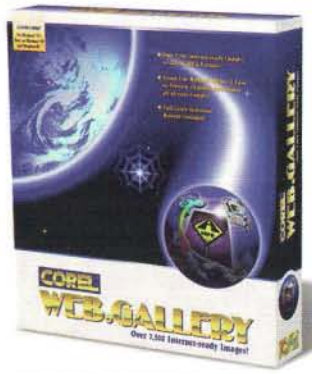


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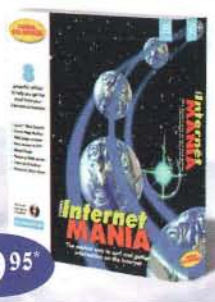


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act that were intended only to protect minors from communications deemed inappropriate for them will have the effect, perhaps unintended, of depriving adults of communications that are appropriate, and indisputably constitutionally protected, for them. Because of the way the Internet works, the act's prohibition of communications that may be deemed "indecent" or "patently offensive" for minors will effectively ban those same communications between adults, reducing the adult population in cyberspace to only what is appropriate for minors. The banned speech includes valuable works of literature and art, information about health and medical issues, and examples of popular culture. It also includes robust human discourse about politics, current events, and personal matters that may at times include harsh, provocative, or even vulgar language, all of which is constitutionally protected for adults.

The speech at issue in this case does not include obscenity, child pornography, harassing speech, speech intended to entice or lure minors into inappropriate activity, or other speech that lacks First Amendment protection even for adults. This complaint does not challenge governmental regulation of those categories of nonprotected speech, and the relief sought herein will not affect the government's ability to prosecute the communication of those categories of speech, all of which are already prohibited by existing law.

The most sweeping provision of the act prohibits the "display" of material deemed "patently offensive" "in a manner available to a person under 18 years of age." That provision is subject to certain defenses, which the sponsor of the act and Congress apparently believed would enable speakers to restrict access by minors while simultaneously permitting access by adults. But those defenses, which were merely lifted from the "dial-a-porn" laws, simply do not work in the quite different medium of cyberspace. Because of the manner in which information is stored, transmitted, and received on the Internet, this provision has the (perhaps unintended) result of banning speech between adults that is suitable and constitutionally protected for adults.

The act is also unconstitutional because there are alternative ways of protecting minors from material inappropriate for them that would not abridge the First Amendment rights of adults and would be more effective in protecting minors than the mechanism Congress imposed. The speaker-based blocking required by the act will not protect minors from access to words and images posted on the Internet abroad by foreign speakers, who are not effectively subject to prosecution under the act, or even by domestic speakers who intentionally or inadvertently violate the act. But user-based blocking technology enables parents and other users to block or screen whatever words or images they deem inappropriate, regardless of where posted, at little or no cost. For these reasons, every application of the act unnecessarily and unconstitutionally abridges the First Amendment rights of adults, and does so even though there are less drastic alternatives that would be more protective of minors.

**PLAINTIFFS**

**American Library Association Inc.**
**America Online Inc.**
**American Booksellers Association Inc.**
**American Booksellers Foundation for Free Expression**
**American Society of Newspaper Editors**
**Apple Computer Inc.**
**Association of American Publishers Inc.**
**Association of Publishers, Editors, and Writers**
**Citizens Internet Empowerment Coalition**
**Commercial Internet Exchange Association**
**CompuServe Incorporated**
**Families Against Internet Censorship**
**Freedom to Read Foundation Inc.**
**HotWired Ventures LLC**
**Interactive Services Association**
**Microsoft Corporation**
**The Microsoft Network**
**Netcom On-Line Communication Services Inc.**
**Newspaper Association of America**
**Opnet Inc.**
**Prodigy Services Company**
**Society of Professional Journalists**
**Wired Ventures Ltd.**

**v.**

**DEFENDANTS**

**United States Department of Justice**
**Janet Reno, Attorney General of the United States,**
**United States Department of Justice**

### A unique medium

The vast majority of transmissions of content from specific sites on the Internet are in response to electronic requests the user could not have anticipated more than a few seconds or moments before making the request. Because information is located on millions of computers around the world, with no central organization or control, a user cannot possibly know which computers might have useful information until starting a search. Indeed, the very theory of "hyperlinks" and HTML (the foundation of the World Wide Web) is that the user can jump from site to site to site without ever needing to know where physically in the world the next site is located.

Thus, there is no way for a user to preregister with every computer that might contain useful content on a particular topic. If a researcher were required to request access from content providers prior to actually viewing the information (and prove to the provider that the researcher was not a minor), the Internet would be transformed from a dynamic and instantaneous content searching tool into a cumbersome, multistep, much slower, and much less useful research tool. The vibrancy and immediacy that sparked the Internet's recent extraordinary expansion and development would be lost.

There are millions of computers on the Internet that contain content, and it would be practically and economically impossible for the tens of millions of Internet users to preregister with each

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of those millions of content sites, and equally impossible for those millions of content sites to maintain and instantaneously update lists of registered users.

For both the speaker and the listener, communications on the Internet bear virtually no similarity to communications on television and radio. With radio and television, the number of speakers is limited by the available spectrum, the ability to speak is limited by the high cost of speaking, and listeners are merely passive recipients of the communications. With the Internet, the number of speakers is boundless, anyone can speak for pennies a day (or free at his or her public library), and listeners can respond and engage the speaker in an interactive and ongoing dialog. Furthermore, unlike television and radio, on the Internet viewers and listeners generally receive only the communications they affirmatively request, and are not a passive or "captive" audience. Moreover, unlike with television and radio, on the Internet a speaker can reach the entire world (at no additional cost) yet at the same time can direct his or her speech to individuals who share an interest in a particular subject.

In the 21st century, the Internet – if allowed to flourish unhindered by government censorship – can revive the now little-used public square and convert it into a global medium of communication and discourse.

### Content on the Net

There is a significant amount of content on the Internet that could be considered "indecent" for minors in some communities in the United States, but which most people would consider to be extremely valuable and appropriate for adults, and which, in any event, is constitutionally protected for adults. Such content includes, for example, great works of art and literature (containing depictions and descriptions of nudes and sexual conduct); examples of modern popular culture (containing popular music, lyrics, movie images, or literature with sexual content); medical information (containing depictions and descriptions of childbirth, sexually transmitted diseases, and sexually related medical conditions); and historical and scientific information (containing, for example, accounts of historic criminal trials or other historical, sociological, and anthropological works). Such content, and other content typically provided by noncommercial providers, is effectively banned by the act.

The fear that some communities in the United States would conclude that this type of valuable material is "indecent" for minors is well founded. Communities across the country have banned or sought to ban classic works of literature, such as *Of Mice and Men* by John Steinbeck, *As I Lay Dying* by William Faulkner, *The Adventures of Huckleberry Finn* and *The Adventures of Tom Sawyer* by Mark Twain, *Catcher in the Rye* by J. D. Salinger, and *I Know Why the Caged Bird Sings* by Maya Angelou, as "indecent" for minors. Even the *American Heritage Dictionary* and parts of the Bible have been attacked as being "indecent" for minors. All of these works (some of which are available in whole or in part on the Internet), and works with similar content, are effectively banned by the act.

In addition to the above type of content that is banned by the act, a tremendous amount of common human discourse is banned by the act. In the course of conversations, discussions, and debates, many citizens use language and imagery that in some communities would be viewed as "indecent" for minors. Vigorous and heated debate often occurs with harsh or vulgar words. Many people, and many speakers on the Internet, use in common discourse words that describe "sexual or excretory activities or organs" in terms that might be deemed "patently offensive" for minors. The use of vulgar words in a dialog with friends – which would be perfectly legal over the telephone or in a letter or on a basketball court – would be illegal under the act if sent over the Internet.

### Who is affected?

Virtually all of the tens of millions of users of the Internet – except those who at all times stand mute in the discourse that occurs on the Internet – are content pro-

viders who are subject to the terms of the act. An individual is a content provider subject to the act if he sends a single email, or participates in a listserv discussion, or contributes to a Usenet newsgroup, or responds to a survey on the World Wide Web, or establishes a personal "homepage" on the Web, or converses with a friend via a real-time service, or simply places a file in a publicly available area of a computer or network.

In other words, virtually any use of the Internet makes someone a content provider subject to the criminal penalties of the act. [Commercial content providers have some means of controlling access to their content, such as through requiring a credit card.] But for noncommercial content providers, who are responsible for a major part of communications on the Internet, there is no practical way the speaker can control who can access the message. Thus, for the vast majority of speech on the Internet, it is impossible for the speaker to prevent the speech from being "display[ed] in a manner available" to a person under 18.

Because of this impossibility, the act effectively requires that almost all discourse on the Internet be at a level suitable for young children. This provision has the effect of a flat ban on an entire category of constitutionally protected speech between adults.

**Why it won't work**

The overwhelming majority of content on the Internet is nonsexual in nature and is not even arguably "indecent" or "patently offensive," even for minors. However, a significant amount of the content on the Internet could arguably be deemed "indecent" or "patently offensive" for minors in some communities, and the act bans or burdens all of that content.

Although it imposes extreme burdens on the Internet, the act will in fact have very little impact on the availability to persons under 18 of "indecent" or "patently offensive" images or communications on the Internet. At least in part because Congress held no hearings on the act, did not collect information about how the Internet works, and only haphazardly reviewed the content on the Internet, the act does not accomplish or even significantly further the ostensible goal of limiting access by persons under 18 to "indecent" or "patently offensive" images. There are at least two reasons why implementation of the act will be highly ineffective as a limitation on such access.

First, a high percentage of sexual content on the Internet originates outside of the United States, and it is not possible to prevent that content from being "available" in the United States. To the extent the act imposes any burdens on domestic commercial providers of such communications, those providers will have the option of moving their operations overseas.

Second, the existence of "anonymous remailers" means that any content – indecent or otherwise – can be placed onto the Internet anonymously, and the government would be unable to identify the content provider. Anonymous remailer systems – which often are located overseas – will automatically receive a communication and forward it to a destination after having removed all traces of the origin of the communication.

At bottom, therefore, the act does little to limit the ability of commercial or noncommercial entities to provide "indecent" or "patently offensive" images on the Internet.

**What *would* work instead**

A critical difference between the act's attempt to regulate indecency on the Internet and prior governmental attempts to regulate indecency (over radio, television, and telephone sex lines, for example) is that there are tens of millions of speakers on the Internet, with no bottleneck through which all of the speech must pass.

There are alternative means that are far more effective in limiting a minor's access to "indecent" or "patently offensive" communications. The only place where it is practically possible to screen out commercial indecency, noncommercial indecency, domestic indecency, overseas indecency, intentional indecency, inadvertent indecency, and anonymous indecency is in the computer that is attempting to receive the speech.

The government's legitimate interest in aiding parental control over the Internet material their children access may be served by several means that are both less

**THE STATUTORY LANGUAGE AT ISSUE**

**Signed into law on February 8, 1996, the Communications Decency Act criminalizes the display and distribution of constitutionally protected expressive material.**

**The act contains two primary criminal provisions. Violation of either provision is a felony, punishable by as much as two years in prison and substantial fines.**

**Section 502(2) of the act broadly prohibits knowingly using any "interactive computer service" to send to a specific person or persons under 18 years of age, or to "display," "in a manner available to" a person under 18, certain "patently offensive" communications.**

**THE SPECIFIC LANGUAGE STATES:**

**Whoever –**

**(1) in interstate or foreign communications knowingly –**

**(A) uses an interactive computer service to send to a specific person or persons under 18 years of age, or**

**(B) uses any interactive computer service to display in a manner available to a person under 18 years of age, any comment, request, suggestion, proposal, image, or other communication that, in context, depicts or describes, in terms patently offensive as measured by contemporary community standards, sexual or excretory activities or organs, regardless of whether the user of such service placed the call or initiated the communication; or**

**(2) knowingly permits any telecommunications facility under such person's control to be used for an activity prohibited by paragraph (1) with the intent that it be used for such activity, shall be fined under Title 18, United States Code, or imprisoned not more than two years, or both.**

restrictive and more effective than a blanket ban on "indecent" or "patently offensive" communications. Parents have control over their child's access to communications through interactive computer services. For example, parents can deny their child access to the computer; parents can supervise their child's use of interactive computer services; parents can decline to subscribe to interactive computer services until their child is older; parents can take advantage of the free screening and blocking options available from commercial online services; and parents can obtain software (some of it free, and most of it for a very modest cost) for their home computers to screen material they find objectionable.

Commercial online services such as America Online, CompuServe, The Microsoft Network, and Prodigy offer technologies that allow parents to block their child's access to certain online forums and areas where children might be exposed to inappropriate content. These online services, for example, include a feature that allows parents to prevent their children from accessing interactive discussion forums (chat rooms). They also offer parents the ability to block access to all or portions of the Internet, including the World Wide Web and Usenet newsgroups, based on keywords, subject matter, or names of specific newsgroups. These tools can be configured to block access to groups based on any keyword.

In addition, a variety of software providers have developed applications to use in conjunction with commercial online services, over and above the parental control features provided by commercial services, while others are designed specifically for direct access. SurfWatch, for example, allows parents to block their child's access to Usenet newsgroups and World Wide Web, gopher, and ftp sites with sexually explicit content. When activated with a private password held only by a parent, SurfWatch completely prevents any user from accessing these areas. The service automatically updates the list of blocked sites, without any intervention required from the user. Net Nanny, another example, contains a dictionary in which the parent can enter the names of sites that contain sexually explicit or other material. Parents may also enter phrases that if transmitted or received will automatically disconnect the network. Among other things, the program also keeps a log of all activity that occurs on the computer, allowing parents to monitor their child's computer use.

Because the Internet is a global network with millions of users, speaker-based content restrictions cannot effectively control the availability of materials inappropriate for children.

The only effective way to protect children from inappropriate material on the Internet is to encourage the continued development and deployment of user-based tools that empower parents to control their children's online activities based on the parents' views of what is appropriate for their children. The products described here, and others like them, provide parents with these tools, and can do so without the need for criminalizing or banning the distribution to adults of constitutionally protected communications.

### The impact of the act

Any government regulation of "indecent" or "patently offensive" speech may withstand constitutional scrutiny only if it both serves a "compelling interest" and is "the least restrictive means" to advance that interest, and only if the benefit gained from the act outweighs the loss of constitutionally protected rights.

The government has no legitimate, much less "compelling," interest in preventing adults from sending or receiving "indecent" or "patently offensive" speech. The government has no legitimate, much less "compelling," interest in preventing older children from sending or receiving speech that would only be deemed "indecent" or "patently offensive" if communicated to younger children.

One legitimate interest the government does have – and the only interest articulated in the act – is to assist parents in supervising their children's access to expressive materials. The act does not, however, further that interest. Indeed, the act interferes with that interest because parents who decide that their children, whether 7 or 17, should have access to some materials that some community might deem "indecent" or "patently offensive" for those children are

#### WHAT YOU CAN DO

**Although the battle over the Communications Decency Act has moved into the courts, there's still plenty you can do to demonstrate your opposition to Internet censorship.**

- **First, familiarize yourself with the full text of the Communications Decency Act by checking in at *www.cdt.org/policy/freespeech/12_21.cda.html*.**
- **Next, you can read the full text of the Citizens Internet Empowerment Coalition complaint at *www.cdt.org/ciec/complaint.html*. The full text of a separate complaint filed by the ACLU lives at *www.epic.org/free_speech/censorship/lawsuit/complaint.html*.**
- ***HotWired* has put together a special overview of why these lawsuits are important and why we're confident that we'll win. Visit *www.hotwired.com/special/lawsuit*.**
- **The Electronic Frontier Foundation has embraced the blue ribbon as a symbol of civil liberties in cyberspace. You can add the image of a blue ribbon to your Web page by visiting *www.eff.org/blueribbon.html*. By wearing a blue ribbon on your jacket, you'll also carry the free speech message with you while exploring meatspace.**
- **Finally, you can stay informed. To make this easier, *Wired* section editor Todd Lappin has set up a private mailing list to provide up-to-the-minute updates and background on efforts to have the Communications Decency Act stricken from the law books. To subscribe, send mail to *majordomo@wired.com* with "subscribe cda-bulletin" in the body of the message.**

prevented from exercising their parental judgment by the act's blanket prohibition on all access by all persons under 18 to all such materials.

Even if the government had a legitimate interest, more broadly, in preventing interactive computer service access by all persons under 18 to communications that some community might deem "indecent" or "patently offensive" to them, the act would not materially further that interest. Among other things, communications of foreign origin are freely accessible on the Internet, and the United States government has no means to prosecute foreign content providers for violation of the act or to deter such postings. Furthermore, existing statutes already prohibit the use of computers to disseminate obscenity, child pornography, harassing speech, enticing or luring minors into inappropriate activities, and other speech that is not protected even for adults.

Even if the act could be viewed as substantially furthering a compelling governmental interest in protecting minors from "indecent" or "patently offensive" communications, it is not the least restrictive means of achieving that interest. The screening and blocking tools described above achieve that interest far more effectively than does the act itself, and with no adverse impact on the constitutional rights of adults. Efforts by government to spur the further development of such tools would further the claimed governmental interest more directly and materially than does the act.

Even if the act could be viewed as the least restrictive means to further a compelling governmental interest in protecting minors from "indecent" or "patently offensive" communications, any benefit gained from the act would be far outweighed by the loss of constitutionally protected rights of adults, because only some applications of the act will in fact protect minors, but every application of the act will punish or deter speech that is constitutionally protected for adults. ■ ■ ■

*The brief from which these excerpts are taken was prepared by Jenner & Block, lead counsel.*


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# Caught by Coherent Light

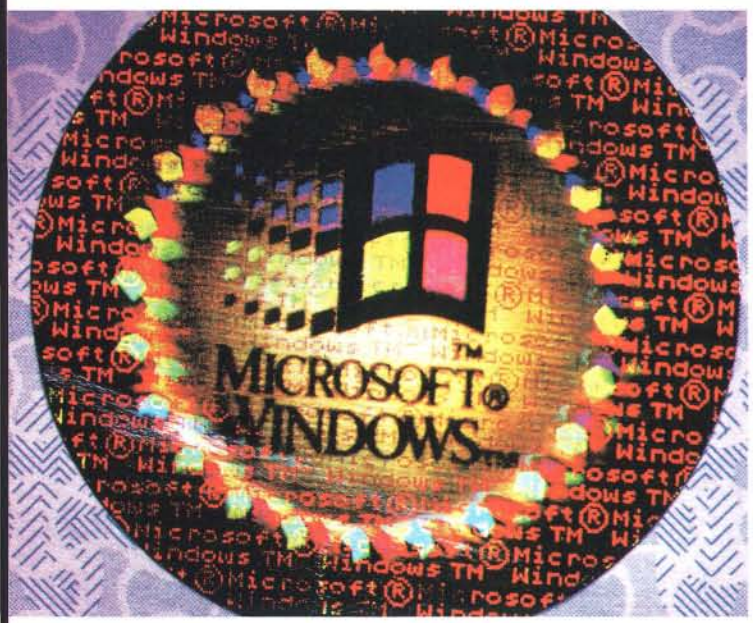
www.wired.com/4.05/counterfeiters/

## That little security hologram on your software package? It works – as this LA gang of counterfeiters found out.

**By Denise Hamilton**

They didn't set out to commit the most serious counterfeiting crime in recent history. All they wanted was a piece of the American dream – even if they had to manufacture it themselves. And they came awfully close to pulling it off.

Working out of clandestine factories in Los Angeles County, six men in their 20s, some of whom still lived with Mom and Dad, assembled the biggest software counterfeiting operation the United States had seen so far. By the time they were caught last year, the counterfeiters had duplicated enough MS-DOS and Windows to defraud corporate giant Microsoft of up to US$4.7 million. That's enough to keep the Redmond, Washington, headquarters afloat on Starbucks coffee and Jolt cola for at least a week. Bill Gates might have seen the sum as pocket change, but for these young Asian immigrants who dreamed of the good things in life, it must have seemed like a mind-boggling amount of money, and counterfeiting seemed an easy way to earn it.




**With the help of Microsoft – and that little 3-D image that glints off its packaging – California law enforcers were able to block the biggest software counterfeiting operation ever seen in the US.**

Computer software counterfeiting doesn't require the bent genius of a dark-side hacker or the turbocharge of massively parallel supercomputers. As these determined youngsters proved, it can be done with office copiers, disk-duplicating machines, and peel-and-stick labels. Throw in a small nest egg, fifth-grade computer skills, and contacts in the printing world, and presto, our boys were in business. Or so they thought.

But with crime, as with many things, well-thought-out plans can be scuttled by the tiniest details. While the counterfeiters displayed canny sophistication and came tantalizingly near to making a fast fortune, they bumbled on a key front. At the 11th hour, they were undone by a shiny, round, multicolored object the size of a half-dollar.

The Achilles' heel of this little enterprise was a hologram. Real Microsoft software has a holographic seal, and these guys needed one to match. But when they tried to procure the 3-D images, the scam began to unravel. Meanwhile, the hologram did just what it was supposed to – protect Microsoft's software from being counterfeited. The hologram even helped police catch the bad guys. A corporate good luck amulet for the 21st century, the mini-image triumphed.

Holograms are deceptive little things. You'll see them in novelty stores – those kitschy, laser-produced images that seem to flicker and move as you hold them to the light. But don't dismiss them as nothing more than a pretty picture. Holograms are one of the best security devices ever invented. Their laser images are extremely difficult to duplicate, requiring expensive equipment, technical know-how, and artistic skill. That's why companies are commissioning them like hotcakes these days and slapping them onto everything from credit cards to new CDs. And, of course, computer software.

Yet for every proprietary hologram, there's a high-tech artist out there who'll try to copy it. These are the forgers of the new millennium. Many live in Asia, where counterfeiting is epidemic. But the recent trade heat over Chinese counterfeiting could be pulling the industry to this side of the Pacific Rim.

"A monkey could probably duplicate a computer disk," muses Larry Morrison, the deputy district attorney who prosecuted the Microsoft case. "And almost anyone can have some documents printed. But the key security devices are these hologram seals. That's what really makes it a true product."

Is there a moment in history each of us would live differently if given a second chance? An instant when we crossed a clearly marked line, knowing that nothing would ever be the same on the other side?

For Kim Fee Chean, a 27-year-old Burmese immigrant who lived with his parents and six siblings in a gritty neighborhood just five miles from the neon towers of downtown Los Angeles, that moment came one day in June 1994. That was when Chean first

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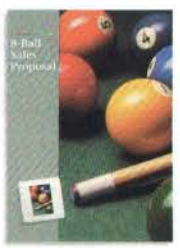
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picked up the phone and called James Armstrong. (At his request, his name has been changed for his protection.)

Depending on the quality of Armstrong's work, Chen reckoned he might need up to 30,000 of the complex designs per month.

**Chen finally came clean: he wanted Armstrong to copy the holograms affixed to Microsoft software.**

Armstrong is a hologram maker whose name Chean had plucked out of the phone book. A tall, rambling guy who sports cowboy boots and a ponytail, he's a fixture in the hologram industry. Some of his more rarefied pieces hang in high-tech art galleries. He is especially proud of a moving holographic business card he once designed for the Prince of Brunei.

But in the summer of 1994, Armstrong got a more unusual request. He received a call from a young man named John Chen. In fact, the call was from Kim Fee Chean, who had already crossed over into dangerous territory and assumed a new persona. Chean, now Chen, wanted to know if Armstrong could duplicate a hologram. He offered to pay good money.

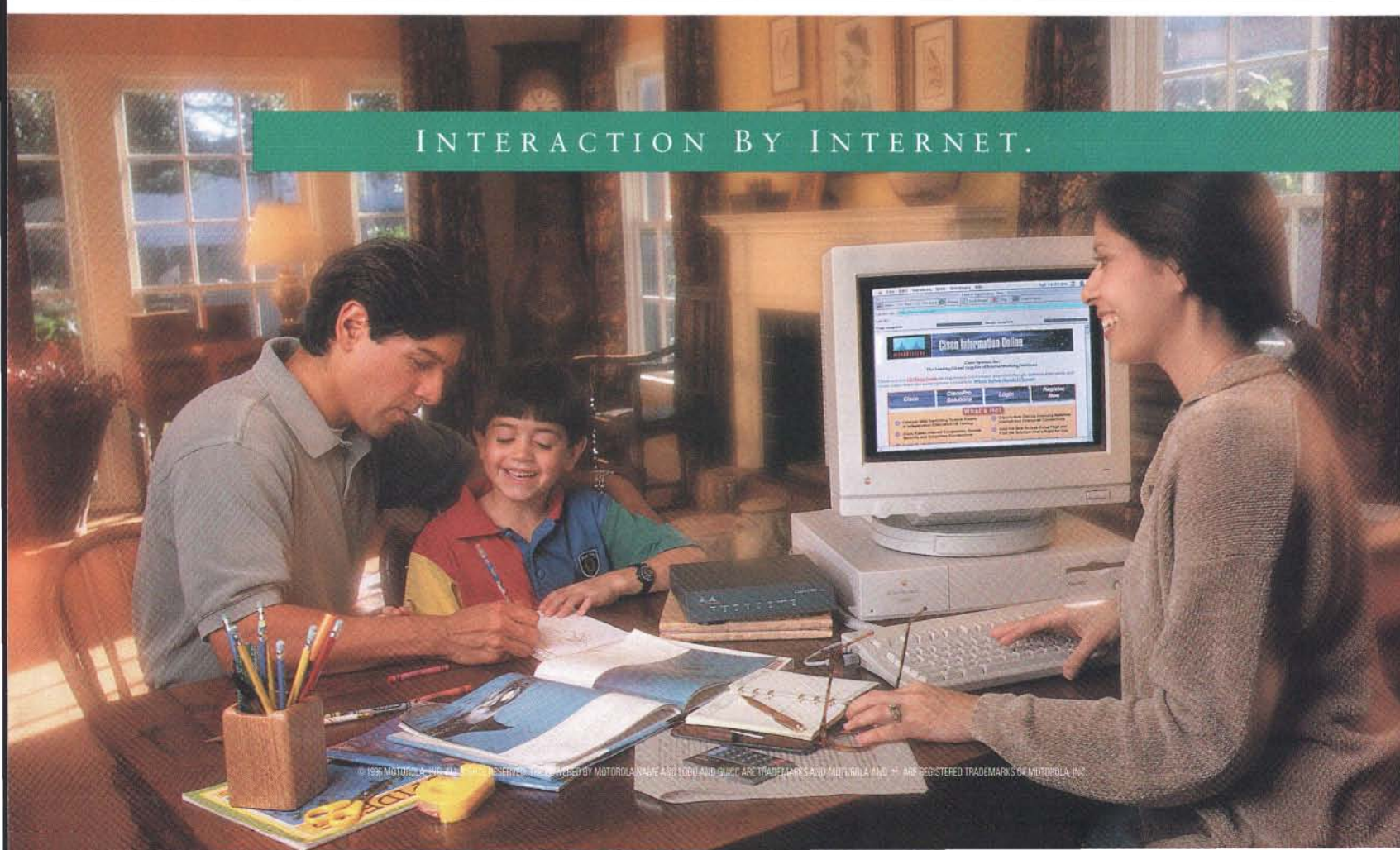
Armstrong, who has been in the business 20 years, smelled a rat. For one, he says, Chen was promising dollars for something that costs pennies to make.

On top of that, "what he described sounded suspiciously like a security hologram," Armstrong says, while kicking back recently in the ramshackle office of one of his legitimate clients, near Hollywood Boulevard and Vine.

After a few more conversations, Chen finally came clean: he wanted Armstrong to copy the holograms affixed to Microsoft software. Stalling for time, Armstrong explained he was only a middleman; he'd talk to a friend and get back to Chen. Then he picked up the phone and called the security department at Microsoft.

Despite Cypress Park's run-down appearance and abundance of graffiti, you can tell it was once desirable in a film noir sort of way, with its tidy Spanish tile-roofed houses, palm trees, and California bungalows with wraparound porches. Now most everybody has security doors and mean-looking guard dogs. The Cheans, who bought their home here 18 years ago, have two rottweilers. When I bang on the wrought-iron door, the Cheans agree to tell their side of the story. Two of their sons were ensnared in the Microsoft caper. Kim Fee Chean is serving three years in prison. Younger brother Kim Fong Chean, 25, got off with probation.

James Chean, 34, the oldest son and a filmmaker, does most of the talking as his parents listen in. They are ethnic Chinese who emigrated 20 years ago from Burma, where the family patriarch had a thriving construction business. In America, the



elder Chean could only find work making custom furniture. But the trade-off was worth it. The father wanted his kids to get an education.

Close-knit and religious, the Cheans hewed to Buddhist tradition in the City of Angels, setting up a red and gold altar to their ancestors in the front room. During festivals at the local temple, Kim Fee and Kim Fong Chean cooked huge platters of Burmese food. When plain-clothes police arrived with guns drawn to search the Chean house in February 1995, the mother was so terrified she ran out back, jumped a five-foot fence into her neighbor's yard, and called 911 to report a home invasion.

Beginning in their teens, the siblings all worked to help support the family. "Since we've come to this country we have never been on welfare," James Chean says. "We'd rather be poor but honest. If you don't have money, you just don't buy things."

Unlike the older children, who remember Southeast Asia, Kim Fee and Kim Fong Chean started school in the United States. They hung out with friends who were westernized. They ate cheeseburgers and ran in marathons. Kim Fee Chean went to trade school and did odd jobs at home, fixing up the family cars, including his prized 1977 BMW 633i. Kim Fong Chean worked and took classes at the local state university. He aimed for a career in business and studied until 4 a.m. Now on probation, Kim Fong Chean is back in school. He doesn't want to meet with me.

"He just wants to forget," James Chean says. "He studies hard and doesn't want to let our parents down."

As for Kim Fee Chean in prison, he doesn't want to talk either. But James Chean says his industrious sibling isn't sitting still. He's learning Lotus 1-2-3.

We part at the gate, with the vicious guard dogs licking my hands. I'm impressed with the dignity of the family. But their earnest words paint a picture of young men torn between Old World traditions and New World fast bucks. "My brothers are not criminals," James Chean says. "I don't know how they got involved. But Kim Fee deserved a better deal. They were just trying to make a little money."

**When police arrived, the mother was so terrified she jumped a five-foot fence into her neighbor's yard and called 911.**

After Armstrong's suspicions moved him to act, he was eventually put in touch with Detective Jess Bembry of the Los Angeles Sheriff's Asian Organized Crime Unit. To Bembry, Armstrong's story sounded familiar. For several months, the unit had heard reports that a young Asian male was trying to buy security holograms. Now, with Armstrong and another hologram maker's cooperation, they just

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might catch him. Bembry got permission to tap Armstrong's phone so he could trace John Chen's calls. When things heated up, Bembry planned to go undercover as a fellow hologram maker. Once money changed hands, the crime unit could move in for arrests.

By October 1994, Microsoft's extensive antipiracy unit was also getting word that someone was sniffing around the edges of the empire, inquiring about counterfeit holograms. Bogus software had surfaced in Europe, Israel, and Canada. Soon Microsoft and the police were exchanging information and planning strategy. The company had big reasons for stopping the counterfeiting. The $40 billion US software industry loses more than $2.8 billion annually to illegal copying, much of it to counterfeiting.

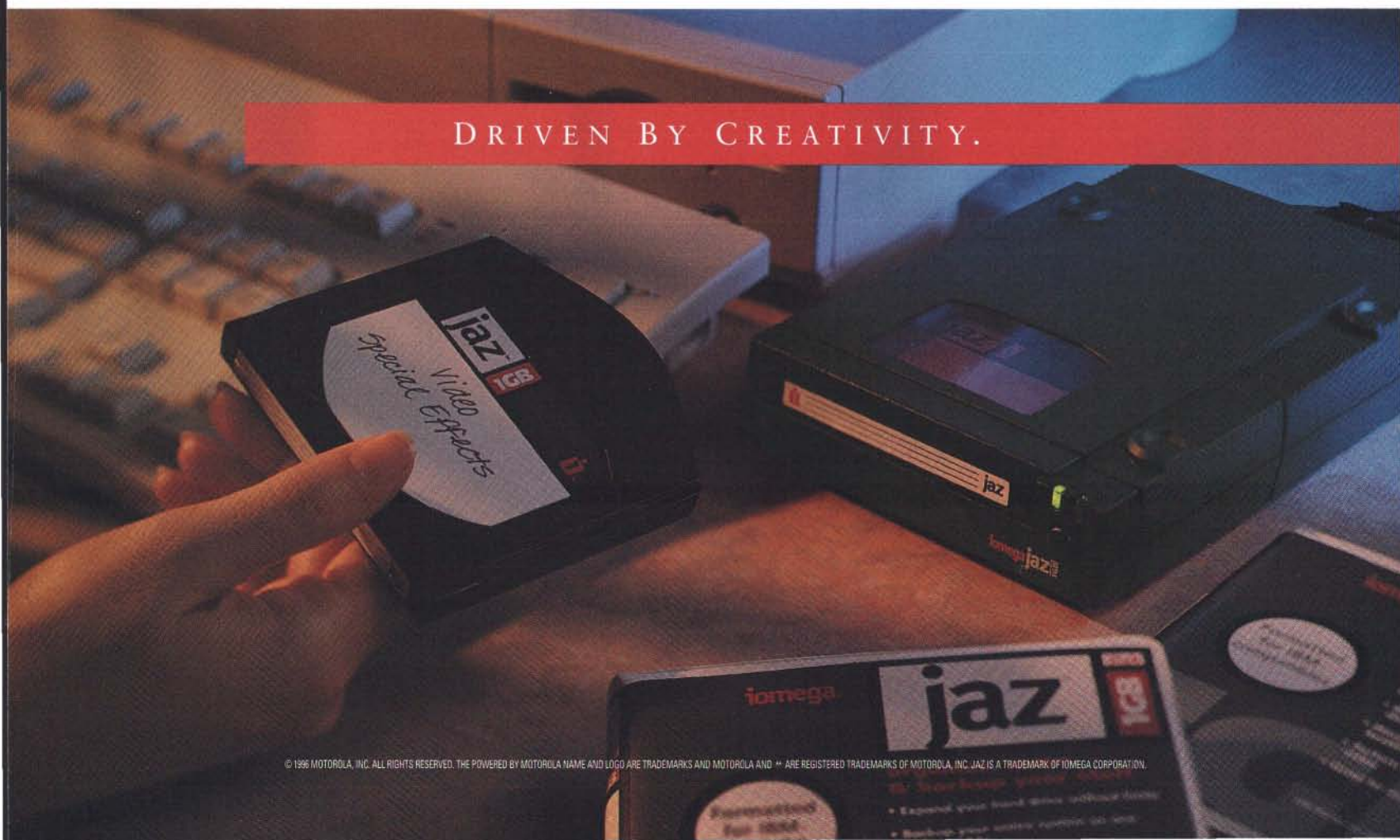
Piracy – when you copy *US Navy Fighters* for your brother-in-law so he, too, can shoot down Russkies – is illegal but not always practical for companies to fight. Counterfeiting is when you copy software en masse for profit, and that's when software firms hit back hard.

**The San Gabriel Valley is an ideal place for criminals who want to melt undetected into the immigrant community.**

In early 1995, Microsoft flew Bembry up to its headquarters, where he attended a company-run school that teaches law enforcement officers how to detect counterfeits of Microsoft products. The course showed Bembry how the firm copies, packages, and ships its diskettes. It also went into security measures, including its most sophisticated weapon against counterfeiting – the holographic seal. Security officials showed Bembry how Microsoft affixes its proprietary hologram onto certificates of authenticity, which are printed on special bond paper, in a process similar to the printing of US currency. Bembry also learned how to distinguish authentic holograms from counterfeits. For instance, some counterfeit holograms are .05 of an inch smaller in diameter than real ones. Later, Microsoft passed on to Bembry a powerful crime-fighting tool, one that would eventually crack the computer-counterfeiting case open. Security officials gave him 7,500 specially altered holograms to use in a police sting.

As 1994 waned, the authorities were not the only ones getting their act together. Since none of those arrested is talking, the story must be pieced together from court documents, evidence seized during raids, and conversations with authorities. But this much is clear:

In the San Gabriel Valley, 10 miles east of downtown Los Angeles, a 25-year-old man named Chew Ping Kwan rented a single-story, yellow stucco house with white trim. With a population of 1.3 million, the San Gabriel Valley is a bubbling



brew of new immigrants and Waspy old-timers, small industrial firms, mom-and-pop restaurants, and multimillion-dollar shopping centers. It's also a hub for Asian immigration, particularly Chinese. All the big Pacific Rim cities are morphing into 21st-century polyglot capitals, but in the San Gabriel Valley, the future is already here. It's the ideal place for Asian suburbanites and investors to plunk down cash for legitimate purchases, as well as for criminals who want to melt undetected into the large immigrant community.

In his new rental house, Kwan installed a large copy machine. Three of the defendants rented another house in the San Gabriel Valley from a young man named Joseph On Lee, whom they met at a local billiards hall. Lee, 27, is a naturalized US citizen who managed the rental property for his brother, the owner.

Somehow Kwan, his younger brother Gin, Lee, and Long Sheng Yang, another accomplice, had made the acquaintance of the Cheans. None of these young men were known as criminal types. Several worked part-time jobs and attended college. But unbeknownst to their families and friends, they now set about turning the rented properties into software duplicating and packaging factories. Soon, the houses hummed like electronic hives. In addition to the industrial copier that ran off instruction booklets, there were five high-speed disk duplicating machines that worked in shifts. Against the wall, stacked four feet high, were boxes with 25,000 blank computer disks, stick-on Microsoft labels, software license agreements, and more than 50,000 fake certificates of authenticity. A shrink-wrapping machine stood nearby.

Lee kept records of how much was produced each day. A November 26 entry read "2,000 DOS." The handwritten logs, which police found in Lee's wallet, continued until February 14, 1995, shortly before police shut down the operation.

**Back in Redmond, the corporate spooks must have loved bringing this scheme down.**

Not all the action took place in the house. Kwan paid a small San Gabriel Valley firm more than $200,000 to print about 83,000 instruction manuals for MS-DOS and Windows. Chean paid another Valley printer more than $87,000 for similar work. The printers' connections to the sextet are still being probed. Could they have guessed that Chean & Co. weren't authorized representatives of Microsoft? Well, times are tough all over. They took the jobs and didn't ask questions.

By early 1995, the group was almost ready. But there was one missing link. If they wanted to get top dollar on the black market for their bogus software, they needed Microsoft holograms. The coun-

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terfeit software would find avid buyers even without the 3-D seals, but with the holograms their software could also be sold to unsuspecting legitimate dealers.

So Chean went hunting for holograms. Did the counterfeiters take this extra risk because they relished the challenge of producing almost undetectable copies? Were they motivated by simple greed? Perhaps it was both. In any event, after months of silence, Chean, apparently spooked by Armstrong, left a message for another hologram maker, who tipped off the Sheriff's Department. Fresh from his Microsoft training, Bembry went undercover, assuming the identity of the hologram maker.

The two met at a Denny's restaurant off state Highway 60 in the eastern San Gabriel Valley. They must have made a funny pair in that place of chicken-fried steaks, breakfast specials, and vinyl booths. You could picture a domestic argument erupting here on a bad day, but hardly a high-tech computer-crime transaction.

Perhaps after all their cloak-and-dagger conversations, Bembry and his co-workers expected to come face-to-face with a John Woo-style villain. But Kim Fee Chean proved clean-cut, polite, and exceedingly nervous in person. He had two beepers, a cell phone, and preppy casual clothes. Magnanimously, he insisted on paying for lunch. At subsequent meetings, Chean and Bembry hammered out their deal. Chean grew chatty, pulling out samples of the Microsoft hologram he wanted copied. Most of his software was going outside the United States, Chean confided. He sold it for $11 per package, while the authentic Microsoft software retailed for $40 to $50. Chean also displayed shrewd instincts: he told Bembry he needed 10,000 holograms for MS-DOS 6.2 by February 22 because another counterfeiter was making the same product and Chean wanted to beat him to it.

After agreeing on a price of $1.25 per hologram, Chean forked over a $1,000 deposit. In exchange, Bembry parceled out samples of the altered holograms that Microsoft had given him. Unaware he was being tailed by undercover detectives, Chean left the Denny's parking lot and picked up two accomplices. They drove to a computer store and bought an authentic Microsoft package to compare the holograms. The altered holograms must have passed muster. "These guys were showing them around and jumping up and down, they were so good," one law enforcement official recalls. Now the police had only to trail them quietly and wait for the big purchase to take place.

Eager to cinch the deal, Chean called Bembry to set up another meeting, and in the Denny's parking lot on February 17, Bembry delivered 5,000 holograms to Chean. Chean gave him $6,250. Kim Fee Chean then handed the rolls of holograms to his brother, Kim Fong Chean, who put them in the BMW. Plainclothes detectives watching the scene moved in for the arrests. Over the next several days, the police raided the rental houses, commercial printing facilities, and residences that Chean had unwittingly led them to.

At other locations that were searched, authorities found 200 packages of counterfeit software, printing plates for the Microsoft instruction manuals, $64,000 in cash, three handguns, and an assault rifle. In Yang's apartment, they found $420,000. When they visited Lee's rental property, Lee himself swung the door open and said, "Come on in; look at what my tenants have done."

Lee told police he had rented out the house to three young Asians but evicted them for not paying rent. He also denied knowing anything about counterfeiting. But detectives found evidence to the contrary. For one, there was the large-scale computer laboratory, with machines still running. Police also found a note Lee wrote to Kim Fee Chean giving specific instructions such as: "Wrap 400 DOS with holograms and registration card." He had signed it, "Thanks, Joe." Later, police also found photographic plates used to make Microsoft labels for computer disks in Lee's car. They believe Lee was one of the masterminds of the operation.

Four of the suspects were held on $1 million bail while a grand jury returned a multicount indictment. Rather than face trial, Lee and Kim Fee Chean pled guilty to computer counterfeiting and were sentenced to four and three years, respectively, in prison. The others pled guilty and got probation. Microsoft, which had provided key help in nailing the bad guys, knew it had broadcast a serious message.

Back in Redmond, the corporate spooks must have loved bringing this scheme down. A bust of this scope carries a good deal of meaning: The software cops have no small interest in providing an example for others in the racket when it's so easy to counterfeit Microsoft software. So easy that six bumbling amateurs from the San Gabriel Valley almost made off with their college tuition – 100 times over.

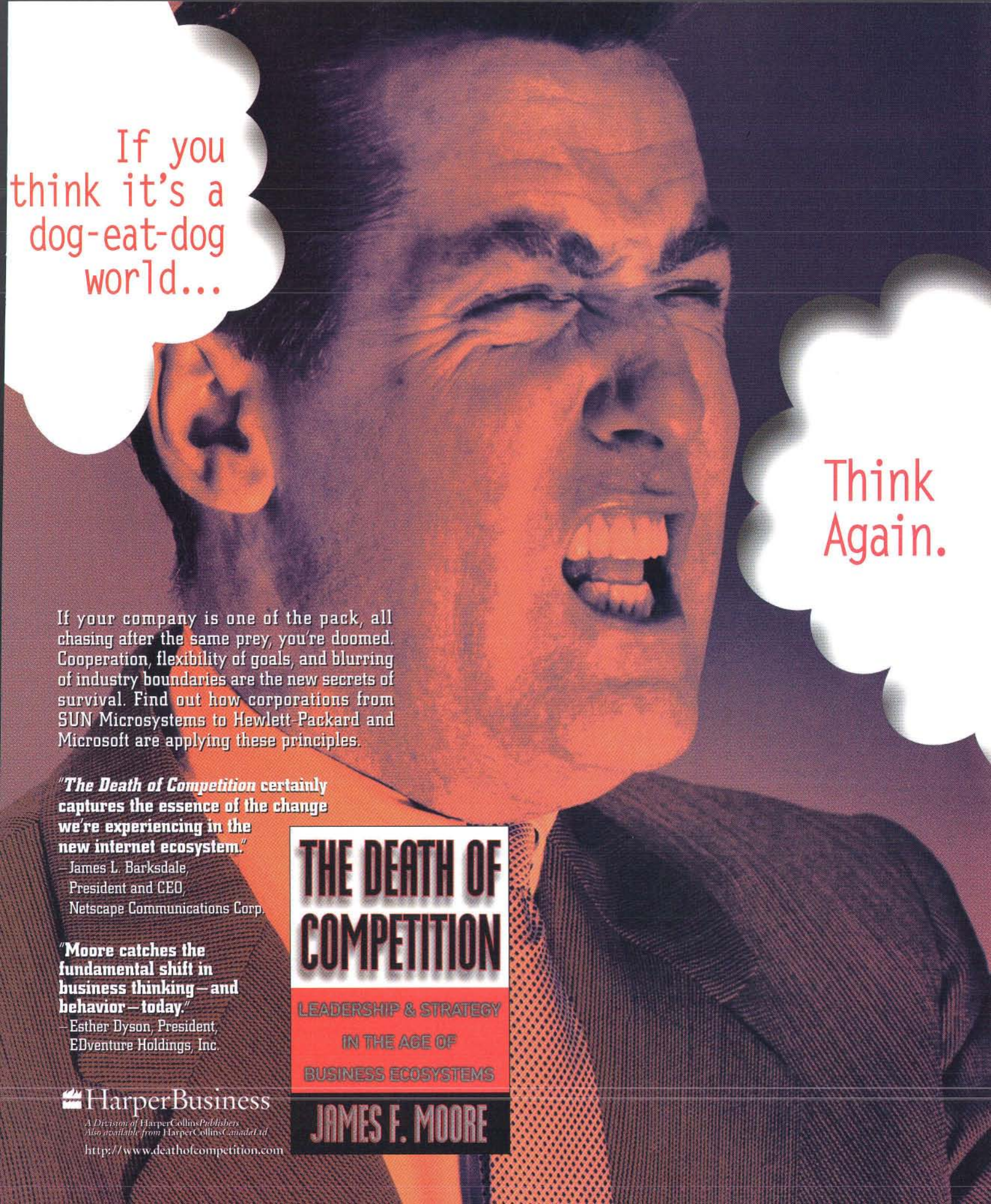
Almost, but not quite. Thanks to the hologram. The inert little 3-D image that glints prettily from packages of Microsoft software proved a committed adversary. When the counterfeiters tried to use proprietary holograms, they unwittingly set into motion a chain of events that led to their ultimate downfall.

In Cypress Park, the story of how close they came to pulling it off provides little solace to the Chean family. "My brother's a good guy," James Chean says. His parents nod in agreement. "This isn't something we're proud of. But it happened, and we just want to get beyond it."

And while Kim Fee Chean pays the piper, James has some advice for his incarcerated brother. "I tell him he should write a screenplay. If he sells it, maybe something good will come out of this." ■ ■ ■

**When the counterfeiters tried to use proprietary holograms, they unwittingly set into motion a chain of events that led to their ultimate downfall.**

*Denise Hamilton* (garza@netvoyage.net) *is a freelance writer who covered the Asian community in the San Gabriel Valley for the* Los Angeles Times *from 1992 to 1995.*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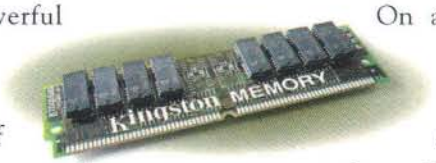


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# Memetic Engineering

By James Gardner

What if culture – even consciousness itself – were nothing more than an artifact of the interaction of selfish memes, ideas capable of replicating and co-evolving with supreme indifference to their impact on human hosts?

A meme-centered paradigm of human culture and consciousness is, to say the least, disconcerting. In *Consciousness Explained*, cognitive theorist Daniel Dennett captures the horror graphically:

*I don't know about you, but I'm not initially attracted by the idea of my brain as a sort of dung heap in which the larvae of other people's ideas renew themselves, before sending out copies of themselves in an informational Diaspora. It does seem to rob my mind of its importance as both author and critic. Who's in charge, according to this vision – we or our memes?*

A meme-focused vision of culture and consciousness acknowledges forthrightly that memes are not mere random effluvia of the human experience but powerful control mechanisms that impose a largely invisible deep structure on a wide range of complex phenomena – language, scientific thinking, political behavior, productive work, religion, philosophical discourse, even history itself.

But consider the matter more closely. What if it were possible to construct a new science of the meme – memetic engineering – analogous to the discipline of genetic engineering? Such a science would allow us to manipulate complex patterns of replicating memes and achieve consistent and predictable manifestations in the form of a precisely altered cultural phenotype. Who would then be in charge of the course of cultural evolution, our selves or our selfish memes?

This may sound like science fiction, but a possible precursor to memetic engineering has already been studied at the Santa Fe Institute. The 2050 Project – an effort jointly pursued by SFI and the World Resources Institute – used a computer modeling tool called Sugarscape to construct a "cartoon history" that mimics the true history of ancient Native American tribes, such as the Anasazi, and then assesses the impact of changes in various cultural inputs – availability of resources, migration patterns, altered assumptions concerning diffusion of cultural mores – on alternate histories that might have transpired but were foreclosed by intervening events in real history.

The objectives of this research, breathtaking in their implications, were described by the investigators in *Growing Artificial Societies: Social Science from the Bottom Up*, a project monograph:

*The broad aim of this research is to begin the development of a more unified social science, one that embeds evolutionary processes in a computational environment that simulates demographics, the transmission of culture, conflict, economics, disease, the emergence of groups, and co-adaptation with the environment, all from the bottom up.*

Research initiatives like the 2050 Project hold out the prospect of such a new kind of social science, as well as the possibility of a new science of memetic engineering.

While predictions about the pace of scientific innovation are notoriously risky, my guess is that by the beginning of the 21st century the

"People want chaos for about five minutes. After that they want a back rub and some money." – *Bruce Sterling*

## Spamming Yourself

By Tim Barkow

I've been sitting around lately trying to think up a good joke. If I come up with something really funny, I'll email it to a few of my friends – and wait. I figure that if it's good enough, someone will eventually end up forwarding it back to me. Whether it'll take months or years I don't know. But regardless, without having to lift a finger or endure anyone's wrath, I will have effectively spammed myself across the world. Then maybe I'll send another email telling everyone that while the joke I sent them was good, the joke I made of them was even better.

*Tim Barkow* (tim@wired.com) *is a section editor at* Wired.

## Anonymizing the Web

By Jamais Cascio

In the US, we are free to speak our minds and to spend money without being forced to reveal our identities – except when using the Web. Browsing the Web leaves digital tracks everywhere in the form of log files, and anyone who hosts a Web site can be easily traced.

This can be changed by extending the existing technologies of anonymous remailers and Web proxy servers. Secure browsing is straightforward: an anonymizer, acting as an intermediary between the browser and a given URL, resends the request from its own location and then directs the result back to the original requester. Serving Web pages is a similar process – the anonymous server retrieves and passes along requested pages without revealing the location of the source.

Crackdowns on Internet content make clear the need for an anonymized Web. Now, someone just needs to implement it.

*Jamais Cascio* (cascio@gbn.org) *is technology manager for Global Business Network.*

"Scientific apparatus offers a window to knowledge, but as they grow more elaborate, scientists spend ever more time washing the windows." – *Isaac Asimov*

embryonic field of computer-based memetic studies either will reveal itself as an intellectual dry hole or will prove to be a technology of extraordinary power.

If the second scenario comes to pass, what are the long-term implications for our self-image as a species – endowed as we are with at least the illusion of free will and blessed, perhaps uniquely among the creatures of this earth, with the baffling gift of conscious thought?

First the dark scenario. Memes might come to be viewed explicitly as the primary actors in the drama of human history, exerting an iron-fisted control precisely analogous to that of Richard Dawkins's "selfish genes" in the pageant of biological evolution.

This is the disquieting vision that Daniel Dennett proffered – the human mind as a mere meat computer, conscious human beings as puppets dancing to the blind watchmaker's hidden melodies. But is this a fair reading of the philosophical implications of memes?

Perhaps not. If we consider the matter carefully, we can glimpse a subtler message lurking between the lines of this emerging discipline. It is the same message implicit in the new science of evolutionary psychology, articulated by Robert Wright in *The Moral Animal*:

*Understanding the often unconscious nature of genetic control is the first step toward understanding that we're all puppets, and our best hope for even partial liberation is to try to decipher the logic of the puppeteer.*

So too in the realm of human culture, our best hope for eventual liberation from an endless succession of dangerous ideologies and blinding prejudices – our best chance for overthrowing the tyranny exercised by blindly replicating memes indifferent to their often devastating impact on the mortal vessels they selfishly commandeer – may lie in a 21st-century enlightenment centered, at least in part, on a rigorous new science of the meme.

*James Gardner previously served as features editor of* Yale Scientific Magazine.

"The State insists that, by thus quarantining the general reading public against books not too rugged for grown men and women in order to shield juvenile innocence, it is exercising its power to promote the general welfare. Surely this is to burn the house to roast the pig.... The incidence of this enactment is to reduce the adult population of Michigan to reading only what is fit for children." – *Justice Felix Frankfurter,* Butler v. Michigan *(1957)*

## Indexing Activity

By Darrel Plant

The multimedia repaving of the World Wide Web is under way with tools like the Java programming language, the Shockwave multimedia player, and the Acrobat portable document format. All hope to put the "activity" into interactivity on the Web.

But these goodies come at a price – and I'm not talking about minor details like bandwidth requirements. No, this is serious. How are we going to find stuff?

Today, with search engines like Alta Vista, you can type in some keywords and get back a list of all the Web documents that contain those words. But with the advent of multimedia Web objects, the words those engines have been indexing are no longer available as easily parsed text – they are contained in compiled, compressed forms.

The possible result? Those advanced, state-of-the-art multimedia sites may end up losing out to the easily indexed HTML sites.

*Darrel Plant* (dplant@moshplant.com) *is writing a book on Shockwave.*

# Eurocrats Do Good Privacy

By Marc Rotenberg

Late last November, David Chaum received the Information Technology European Award for 1995. The prize, given for DigiCash's ecash technology, consisted of a trophy plus 200,000 ecu (approximately US$250,000). Chaum is best known for the development of anonymous payment schemes that are becoming increasingly popular in Europe for everything from online commerce to highway toll systems.

At about the same time that Chaum received the prestigious award, Phil Zimmermann, inventor of the popular Pretty Good Privacy encryption program, sat in his Boulder, Colorado, home wondering whether the US government would make good on its threat to prosecute him for trafficking in munitions. Although federal prosecutors announced recently that they will drop the case against Zimmermann, the prospects that he will get a big cash award from the US government anytime soon are less than slim.

The contrast between a decorated cryptographer in Europe and one trying to avoid prosecution in the United States is more than

"Computer science is no more about computers than astronomy is about telescopes." – *E. W. Dijkstra*

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*The fashion model above was photographed with the PDC-2000 Digital Camera.*

Polaroid Digital Imaging

curious. It shows that governments, at least some governments, can be a force for progress in the crypto world.

Reread that sentence. It is not conventional wisdom in the United States. Cyberlibertarians have been unrelenting in their opposition to any federal role in crypto policy. Free marketers argue simply that there is no place for government in the development of high-tech products. Cyberanarchists seem to doubt whether there is any role at all for government.

"If there was an information revolution, it's over: information won." – *Diana Lady Dougan*

Of course, the Clipper debacle provides plenty of ammunition for these arguments. Clipper combined in equal measure government arrogance, technological incompetence, and profound disregard for the rights of citizens. As an exercise in public policy, it ranks somewhere between the Bay of Pigs and the CIA's experiments with psychics.

But the recent European experience should give pause to these allies in the battle for online privacy. Not only are European officials at the highest levels prepared to embrace technologies of privacy, they have almost uniformly opposed US-inspired surveillance schemes such as Clipper.

Two recent reports are indicative. In "Privacy-Enhancing Technologies: The Path to Anonymity," the Netherlands and the Canadian province of Ontario call for an exploration of new technologies to promote privacy. Similarly, Anitha Bondestam, director general of the Data Inspection Board of Sweden, writes in a recent report, "It is more important than ever to bring back anonymity and make more room for personal space." She urges her colleagues to sharply limit the collection of personal data.

This is bold stuff coming from government officials. Put on the privacy spectrum in the United States, these statements are far closer to the position of many cypherpunks than to that of any officials currently developing privacy policy.

In the United States, to the extent that the federal government has said anything about anonymity, the script is written by the Treasury Department's Financial Crimes Enforcement Network, which is charged with investigating money laundering. Not surprisingly, FinCEN warns that electronic cash will usher in a new era of criminal activity.

It doesn't have to be this way. The reality of modern society is that government officials make decisions every day about the rights of citizens. The question is whether they favor proposals that respect privacy and personal dignity or not. Compared with governments that lack privacy officials, governments that have privacy officials have repeatedly weighed in favor of privacy interests.

Viewed against this background, many of the European privacy regulations, often criticized by libertarians, should be seen for what they are – sensible responses of governments that value their citizens' privacy rights. In such societies, technical means to protect privacy will be adopted – not viewed with skepticism.

Is the European system perfect? Of course not. Are the Europeans doing a better job than Americans of promoting the technologies of privacy? Just ask David Chaum and Phil Zimmermann.

*Marc Rotenberg is director of the Electronic Privacy Information Center* (www.epic.org/).

## A Real Protest

By Byron Jones

With the passage of the Communications Decency Act, I have been trying to think of ways to protest that would be both legal and effective. The "Thousand Points of Darkness" campaign, while highly visible, was largely symbolic and did little to get the point across to the government.

I'd like to suggest a more hard-line form of protest: Shut off Web and ftp access to sites from the .gov and .mil domains.

With a few simple changes to config files here and there, it would be easy to completely block the US government from accessing our Web pages. As they attempt to censor us, let us return the gesture by blocking off their access to our information.

*Byron Jones* (bjones@admiss.msmail.miami.edu) *is a networking consultant in Miami.*

## Demographic Flashback

By The Hyperformr

Ever get a sinking sensation when you call a bank to activate a new credit card, and the issuer's Caller ID system automatically activates the card simply because you called from your home telephone? That sensation is a demographic flashback.

How to deal with these episodes? One friend steps outside herself: Upon hearing her last name butchered the way only telemarketers can, her reply is "She's not here, but if you'd like to leave a message I'll make sure she gets it." With this, she's much like her trance-actions as they bounce around the globe: fractured and dispersed.

Grounds for an identity crisis? Maybe. But just listen to a financial industry ad: Against a backdrop of the song "Stand by Me," a woman praises her Citibank photo-ID credit card, confidently declaring, "Citibank has really given us a new sense of self."

*The Hyperformr* (hyperformr@aol.com) *skates through digital culture in various forms and multiple personas.*

"At times one remains faithful to a cause only because its opponents do not cease to be insipid." – *Friedrich Nietzsche*

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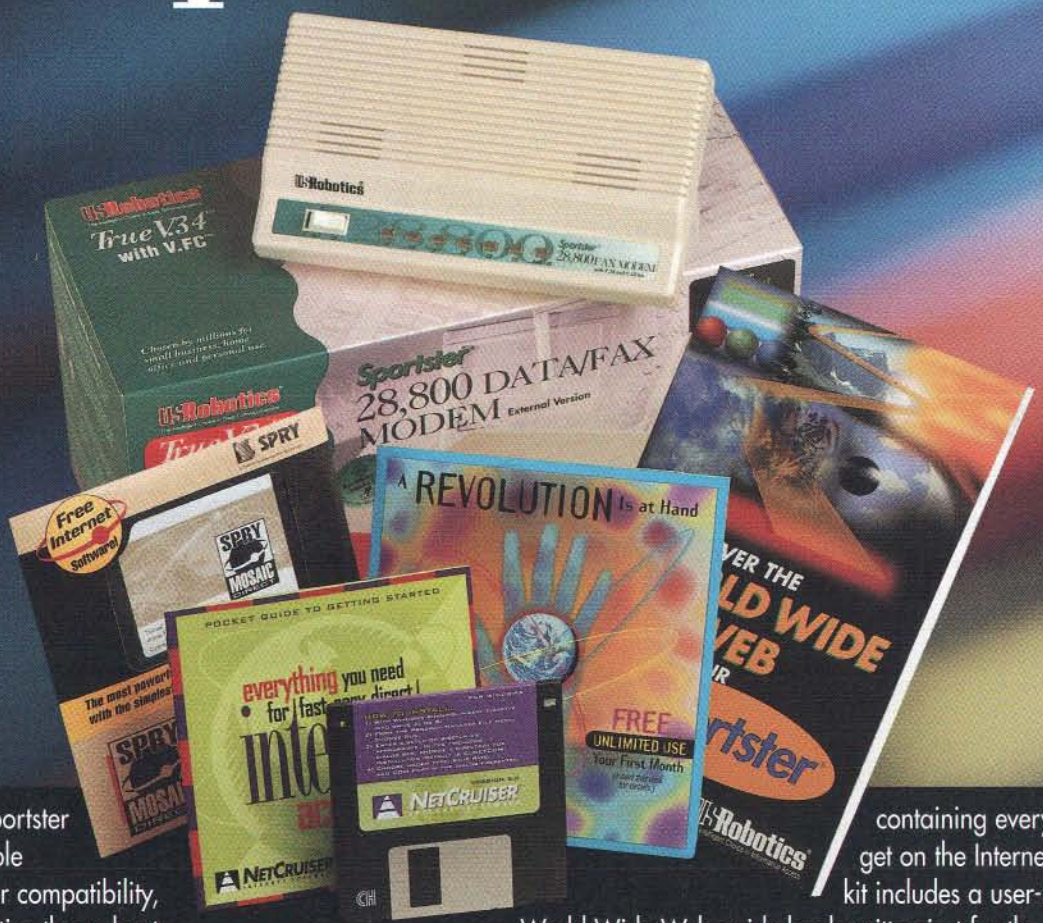


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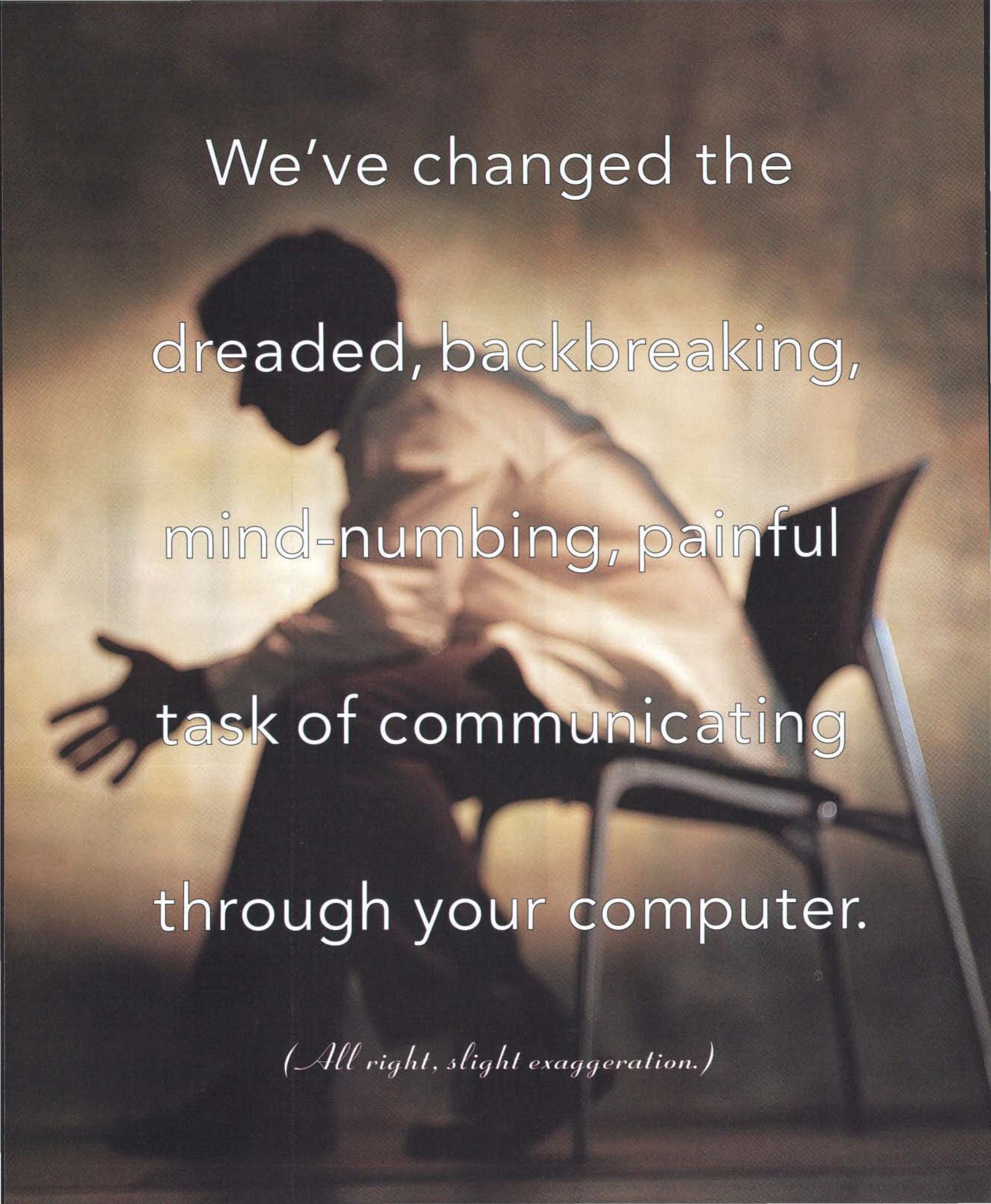
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mind-numbing, painful
task of communicating
through your computer.
(All right, slight exaggeration.)

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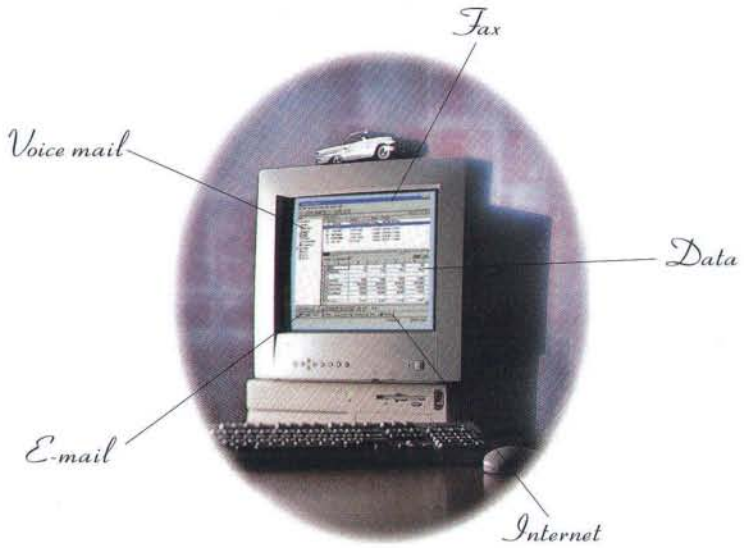


FocalPoint is fully compatible with both Windows® 3.1 and Windows 95, so visit your local reseller and give it a try.

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If you're not too tired.

GLOBAL VILLAGE COMMUNICATION

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In 1668, the English philosopher John Wilkins presented a universal classification scheme to London's Royal Society. The scheme neatly divided all of reality into 40 root categories, including "things; called transcendental," "discourse," and "beasts." These categories were further divided into subgenuses (whole-footed beasts and cloven-footed beasts, for example), and each was carefully documented with examples. Wilkins's eagerly awaited proposal was immediately published and distributed throughout Europe.

Today, Wilkins's system is remembered only as an example of the arbitrariness of attempts to classify the knowable universe. Indeed, the dream of organizing all knowledge has been thoroughly discredited. It peaked in popularity during the 18th century, when the scope of human knowledge was still imaginable and the universe was thought to be rational. By the century's close, projects such as Wilkins's universal classification scheme, or Ephraim Chambers's comprehensive *Cyclopaedia, or Universal Dictionary of Arts and Sciences*, had come to seem utopian. Although a few have continued to dream of a universal library – Vannevar Bush, who de-

www.wired.com/4.05/indexing/

By Steve G. Steinberg

**The most popular sites on the Web today are trying to bring order out of chaos in a frantic quest for the ultimate index of all human knowledge.**

scribed his memex system in 1945; Ted Nelson, who has been working on Xanadu since the early 1970s – they are widely seen as laughable in our relativist, postmodern era.

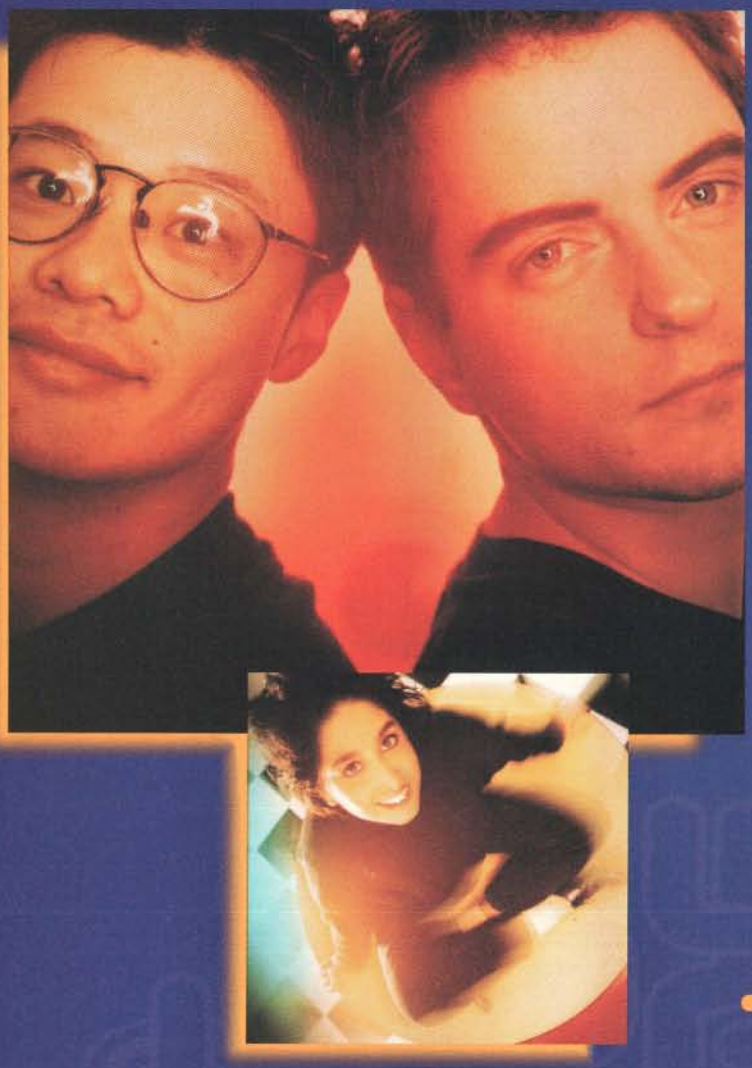
But recently there have been hints of entirely new ways to classify knowledge, new systems for sorting and storing information that avoid the pitfalls of the past and can work on unimaginably large corpuses. The long-moribund fields of knowledge organization and information retrieval are, once again, showing signs of life. The reason, of course, is the Web.

The most popular sites on the Web today are those – like the Yahoo! catalog, like the Alta Vista search engine – that attempt to exert some kind of order on an otherwise anarchic collection of documents. The hard problems of knowledge classification and indexing are suddenly of commercial importance. The result has been a spate of high-tech start-ups, formed mostly by computer scientists and linguists, that are intent on making the Web act more like a well-organized library. Their efforts, rooted in equal parts hubris and brilliance and marked by a conviction that the problem is solvable, can seem startlingly reminiscent of John Wilkins and his contemporaries.

Admittedly, equating the Web with all human knowledge is an exaggeration. But not as much of one as you might think. A year and a half ago, the content of the Web was heavily tilted toward a few niches: there was a lot about Unix and UFOs, not much about real estate or poetry. But today the breadth of the Web comes close to covering all major subjects. Indeed, at its current growth rate, the Web will contain more words than the giant Lexis-Nexis database by this summer, and more than today's Library of Congress by the end of 1998. And the Web defines "knowledge" far more loosely than any library. Even the Total Library of Jorge Luis Borges, which contained all knowledge and its contradiction, didn't include live video feeds of coffeepots. So if the entire Web can be organized, that goes a long way toward organizing all of knowledge as well.

But the difficulty of the task quickly becomes apparent when we look at attempts to solve similar problems. The most obvious place to turn – library science – turns out to be of almost no help. For one thing, even librarians admit that the schemes used today are antiquated and inadequate: the phrase "classification in crisis" has become a cliché in the library community. The most common systems in the US – the Dewey Decimal System and Library of Congress Classification – were developed during the close of the

*Steve G. Steinberg* (steve@wired.com) *is a section editor at* Wired.



*Jerry Yang (top left) and David Filo went from grad school at Stanford to 200,000-and-counting Web sites at Yahoo! They brought in AI-grounded Srinija Srinivasan (above) – aka the "Ontological Yahoo!" – to champion the quest for true classification.*

19th century. Unsurprisingly, they are poor at classifying knowledge in "newly" established fields like genetics or electrical engineering. More important, library classification is bound by restrictions that the digital world is not. While a physical book can be shelved in only one place, a digital document can be placed in several categories at the cost of only a few bytes.

The field of information retrieval, which focuses on automated techniques like keyword indexing for searching large databases, isn't much more encouraging for those trying to organize the Web. The simple reason: even humans are poor at deciding what information is relevant to a particular question. Trying to get a computer to figure it out is nearly impossible.

Given all this, how do researchers possibly believe they can organize the rapidly growing Web? Have they really solved the problems that have stumped scientists for the last 200 years, or are they just ignoring them? And if organizing the Web really is possible, what are the implications?

To figure out some answers, I drove down to a grubby little office park, where transmission repair shops nestle next to high-tech start-ups, in Mountain View, California, to meet with the people behind Yahoo! *(www.yahoo.com/)*. Their cramped office, jammed full with dilapidated desks covered in stacks of manuals, seemed at odds with the lighthearted image Yahoo! projects online. But the disarray clearly reflected the company's rapid growth.

Yahoo!'s statistics are impressive. Created in 1994 by Jerry Yang and David Filo, two disaffected electrical engineering and computer science grad students from Stanford University, Yahoo! lists more than 200,000 Web sites under 20,000 different categories. Sites that track pollution, for example, are listed under Society and Culture:Environment and Nature:Pollution. These categories form what the people at Yahoo! a bit pretentiously refer to as their ontology – a taxonomy of everything. Their ordering of the Web is precise enough – and intuitive enough – that almost 800,000 people a day use Yahoo! to search for everything from Web-controlled Christmas trees to research on paleontology. In almost every way you can measure, Yahoo! has successfully exerted order on the chaotic Web.

But how much longer can its hold last? Already, Yahoo! falls short of cataloguing the half-million or so sites on the Web. The enormity of its task is almost comical – I picture Jerry Yang as Charlie Chaplin in *Modern Times*, confronted with an endless stream of new work that is only increasing in speed. Sites that don't make a point of notifying Yahoo! of their existence often don't end up being listed. And as the Web continues its exponential growth, Yahoo! will have to grow exponentially as well. If it fails to keep up, Yahoo!'s catalog will become like the cyclopedia of Ephraim Chambers, whose claims of comprehensiveness were quickly destroyed by the rapid growth of knowledge.

It's a concern that Jerry Yang, the less publicity shy of the

IMAGES: THOMAS HEINSER

two founders, had been thinking a lot about lately. Not that he seemed terribly worried – at least not at first. A studiously casual 27-year-old from Taiwan, Yang had the Web-to-riches rap down. His speech was peppered with buzzwords. I imagined him coolly promoting Yahoo! – "We're a content-driven, interactive, information provider" – to the executives at companies like Softbank Corp. and Sequoia Capital and walking away with a couple million dollars in financing. (This venture capital will soon be richly supplemented: On March 7, Yahoo! filed with the SEC for an initial public offering.) It was only when he began talking about the intricacies of Yahoo!'s design that Yang reverted back to the CS student he was a little more than a year ago and actually admitted to worrying about the roadblocks ahead. Even then, the fear was covered up by plenty of intellectual braggadocio. As he told me, leaning back and raising his arms in an exaggerated shrug, "I like tough problems. The harder to solve, the better. And organizing the Web is probably the hardest information science problem out there."

That may be, but Yahoo!'s technology, at least, is relatively straightforward. Yahoo! works like this: First, the URLs of new Web sites are collected. Most of these come by email from people who want their sites listed, and some come from Yahoo!'s spider – a simple program that scans the Web, crawling from link to link in search of new sites. Then, one of twenty human classifiers at Yahoo! looks the Web site over and determines how to categorize it.

Really, the only hard part – the only part that your average high-school geek couldn't do – is developing the classification scheme. The ontology. Dividing human knowledge into a clean set of categories is a lot like trying to figure out where to find that suspenseful black comedy at your corner video store. Questions inevitably come up, like Are movies part of Art or Entertainment? (Yahoo! lists them under the latter.)

To solve this problem, Yang and Filo hired Srinija Srinivasan as their "Ontological Yahoo!" Another former Stanford student, Srinivasan is unfailingly helpful, quick to answer any question in her relaxed California accent. Perhaps that's why *Newsweek* claimed she was trained in library science when including her among the 50 people who matter most on the Internet. Actually, her background is in artificial intelligence. But Srinivasan was well prepared for tackling the organization of the Web: previously she had been working at a lunatic-fringe project in Texas, attempting to teach a computer the fundamentals of human knowledge. (See "CYC-O," *Wired* 2.04, page 94.)

Starting with the ad hoc categories she inherited from Yang and Filo, Srinivasan began slowly and deliberately steering Yahoo!'s ontology toward completeness. Mainly, it's been a matter of adding new categories and reorganizing hierarchies as the Web evolves from containing only specialized, technical information to containing content from every field of knowledge. But she's also set up certain guidelines to ensure consistency. For example, every regional Web site is now put in the regional hierarchy, and a cross-link to the site is placed under the appropriate topic. So a Florida real estate company is listed under Florida, with a cross-link from real estate.

A few months ago, Srinivasan told me, she was adding categories and making changes to the ontology almost every day. Now major adjustments are becoming much more infrequent. She pointed to this as support for Yang's assertion that "at some point, our scheme will become relatively stable. We will have captured the breadth of human knowledge."

I'd like to think it was that easy, that the goal of categorizing human knowledge would finally be solved by a few computer scientists in a cramped office park. Yang's obviously honest excitement about the promise of the Web made me want to see him succeed. But a story he and Srinivasan told me about recent events at Yahoo! left me convinced I would have to look elsewhere for the answer.

The story began when the Messianic Jewish Alliance of America submitted its Web page to Yahoo! A classifier quickly reviewed the site – which contains everything from Stars of David to articles about Israel, not to mention the word "Jewish" in its name – and placed it under Society and Culture:Religion:Judaism.

But here's where things got tricky. True, MJAA members are born of Jewish mothers and are hence, by definition, Jews. But they also believe that Jesus Christ is the messiah. In the eyes of most Jews, that makes

the MJAA a bunch of heretics. Or at least Christians.

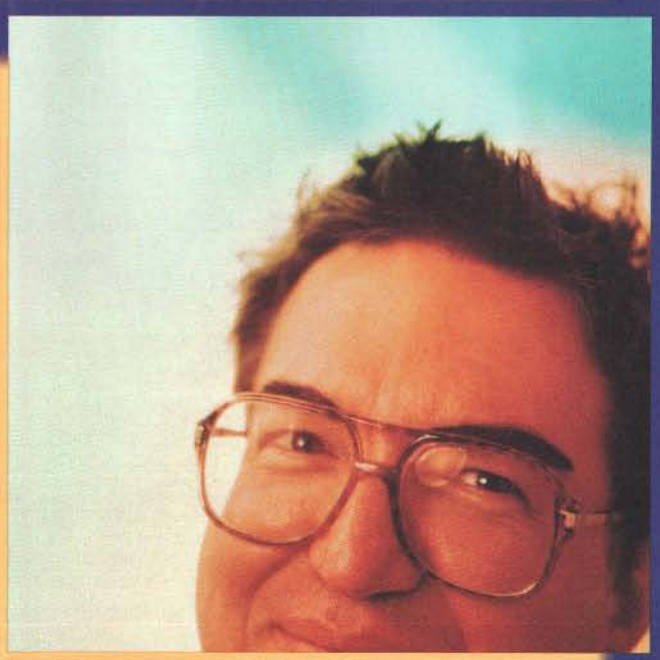
So when a few vocal and Net-savvy Jews saw the MJAA listed under Judaism, they let loose a salvo of email demanding that Yahoo! remove MJAA's listing. A bit taken aback by the protesters' virulence ("threats of boycotts," Yang said with amazement), Yahoo! yielded and reclassified MJAA under Christianity with a cross-reference from Judaism. Of course, this caused the MJAA to protest that they were now being incorrectly labeled. After a modern-day Solomonic compromise, the MJAA and a few similar groups can now be found listed under Society and Culture:Religion: Christianity:Messianic Judaism – which is linked by a cross-reference from Judaism.

Yang looked at me sheepishly when telling this story. After all, he believes in truth, justice, and the Internet way. Hell, he even gave me a mini-sermon that morning about how the Net is egalitarian – the little guy can publish just as easily as the big guy. Yet, he knows the MJAA was pushed around because it didn't have mainstream Judaism's clout.

But the MJAA story is interesting not just for exposing the realpolitik of classification. It's proof that no ontology is objective – all have their own biases and proclivities. Yang was quick to admit this: in fact, he referred to Yahoo!'s ontology as the company's editorial. "Organizing the Web is sometimes like being a newspaper editor and inciting riots," he said with a touch of exasperation. "If we put hate crimes in a higher level of the topic hierarchy, well, it's our editorial right to do so, but it's also a very heavy responsibility."

Yahoo!'s success, Yang argued, is evidence that point of view and knowledge classification are not incompatible. Just as we learn to automatically compensate for right-wing bias while reading *The Wall Street Journal*'s editorial page, we can also learn to adjust for the perspective that Yahoo! embodies. We can learn to think like a Yahoo! classifier. The real problem, Yang and Srinivasan agreed, is making sure that Yahoo!'s point of view remains consistent even as the company expands to keep up with the growth of the Web.

After all, Yahoo!'s point of view comes from having the same 20 people classifying every site, and by having those



IMAGES: THOMAS HEINSER

*Eric Brewer (top left) and Paul Gauthier hatched Inktomi, one of the largest indexes of the Web, at UC Berkeley. Architext's Graham Spencer (middle) jump-started Excite. Now under the Oracle umbrella, Kelly Wical (bottom) has been teaching computers English for 20 years.*

people crammed together in the same building where they are constantly engaged in a discussion of what belongs where. Lose that closeness and the biases will start to become more diffuse. Yang admitted as much, saying, "It's hard to expand Yahoo!, because you end up with too many points of view." Instead of the *Journal*'s editorial page, you end up with something like CNN, where prejudices are masked by a pretense of objectivity. For Yahoo!, that translates to a category scheme where users have a hard time guessing where they'll find what they're looking for.

So Yahoo! is faced with an unforgiving trade-off between the size and the quality of its directory. If Yahoo! hires another 50 or 60 classifiers to examine every last site on the Web, the catalog will become less consistent and more difficult to use. On the other hand, if Yahoo! stays with a small number of classifiers, the percentage of sites Yahoo! knows about will continue to shrink.

Yahoo! will probably take this latter path and simply admit that it is an opinionated guide, a sort of "best of the Web," and not a complete catalog. That will make for a successful business – look at how popular the "cool site of the day" Web pages are – but it doesn't bring us any closer to a universal library.

In my mind, Yang identified the problem with Yahoo! when he noted that "it is much more of a social-engineering problem than a library or computer science problem." By relying on human intelligence to organize the Web, Yahoo! falls victim to subjectivity. The problem must be attacked at some lower level that is amenable to automation.

What's needed, I decided, is an index of the Web. A concordance that keeps track of every word on every Web site. Like a catalog, a keyword index organizes Web sites based on their content, but it does so at the word level instead of by subject. Sites about Messianic Judaism are found by looking for pages that contain the words "Jesus" and "Jewish." This eliminates the subjectivity that plagues classification schemes like Yahoo! – a document either contains the word "Judaism" or it doesn't. However, indexing increases the size of the task from keeping track of millions of documents to keeping track of billions of words.

When the first concordance, or keyword index, of the Bible was compiled by Hugues de Saint-Cher in 1240, the task required the labor of 500 monks. But the labor involved is almost completely mindless; today, a computer can construct a keyword index for a small library in minutes, using a straightforward technique known as an inverted index.

An inverted index is simply a huge table, where rows represent documents and columns represent words. If document *x* contains word *y*, there will be a binary 1 in row *x*, column *y* of the table. To find all documents that contain a specific word, the computer simply scans for 1s in the appropriate column. With a little added work, it's possible to do more complex searches: Find all documents that contain the word "wired" and not the word "amphetamine." The table helps speed up the process because only the appropriate columns, instead of the documents themselves, need to be examined.

Even with the aid of computers, however, the problem of scale becomes daunting as the size of the corpus increases. Depending on whom you ask, the Web currently contains somewhere between 30 million and 50 million pages. (Louis Monier, the technical leader at Digital Equipment Corp.'s Alta Vista search engine, says at least 45 million, while Michael Mauldin of Lycos says 30 to 50.) Given that the average Web page contains about 500 words, or 7 kilobytes of text, we can guess that the Web contains somewhere between 200 and 330 gigabytes of text. And these numbers are growing by 20 percent every month, says Mauldin. In two years, as the Web surpasses the roughly 29 terabytes in the current Library of Congress, will the inverted index become too large to feasibly store? Will it simply take too long to compute? Or will attempts at indexing the Web break down in some other, unexpected way?

To find out, I headed to the computer science department at the University of California at Berkeley, where Eric Brewer, an assistant professor, is studying these questions. I first met Brewer when I was a CS grad student at Cal. He had just been hired after getting his doctorate from MIT, and

he was teaching a course on high-speed networking. I remembered Brewer as a tall, curly-haired guy who was always bobbing his head and smiling nervously while bragging about his research.

He didn't seem to have changed much when I caught up with him in Cal's new computer science building, the startlingly ugly, green-tiled Soda Hall. As we sat down in an empty conference room, Brewer was quick to mention that, along with grad student Paul Gauthier, he had created Inktomi (*inktomi.cs.berkeley.edu/*, named after a mythological spider of the Plains Indians) – one of the largest indexes of the Web. And how, unlike other large Web indexes such as Lycos *(www.lycos.com/)* and Alta Vista *(altavista.digital.com/)*, Inktomi doesn't require a half-a-million-dollar investment in computer hardware. "We didn't just throw money at the problem like those guys," he said. "We've come up with a truly scalable solution." The result, Brewer assured me, is a system that will be able to index the entire Web even five years down the road.

Inktomi is one of the first real-world applications of hive computing (see *Wired* 3.11, page 80). The idea is to create a supercomputer by lashing together lots of existing workstations with a network, then having each workstation work on one piece of a problem. The result is cheap (because you're using off-the-shelf components) and fast (because you can keep adding more workstations to increase performance). Inktomi works by splitting the inverted index of the entire Web over four Sun SPARCstations. This is enough computational power and memory to handle about a million users per day and index several million documents. But despite Brewer's assurance, I wasn't convinced that Inktomi's technique will work when the number of documents and users has increased by two orders of magnitude. At some point, it seemed to me, the Web would be so large, and changing so fast, that it would be physically impossible to keep up. Something would break.

My first guess was that the bottleneck would be getting the data. Right now, indexers use software spiders that crawl through the Web and download every page for indexing. (See "Bots Are Hot!" *Wired* 4.04, page 114.) 172 ►

# Barracuda

**Subterranean = submarine. That's the equation photographer Meryl Meisler postulates in a series of digital images that merge the underworld of New York's subways with images of life underwater. Titled *Grand Splash*, the collection of photographs literalizes the idea of a *sea* of people: a series of 13 transparencies were installed in lightboxes located in the heavily trafficked 42nd Street corridor leading from Grand Central station's main concourse to the Lexington Avenue subway lines.**

**A longtime scuba diver and city dweller, Meisler was taken with the analogy between the two underworlds while on dives in the Florida Keys. With her own aquatic sculptures and underwater photographs shot while diving in the United States, South America, and the Caribbean, she uses computer imaging to submerge Grand Central Terminal and fill it with new life. The idea is to create, Meisler says, "an Atlantis-like representation of the terminal as a whimsical underwater environment. The surreal beauty of the man-made and natural worlds are juxtaposed ... to focus the viewer on the need to nurture ... our resources. Will we continue to grow as a civilization or sink like Atlantis?"**

**Meisler has also depicted *herself* in this undersea world – as a barracuda. – *Phil Patton***

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*Phil Patton* (pattonp@pipeline.com) *is a regular contributor to* Wired.

Metro-North
Commuter
Railroad
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29
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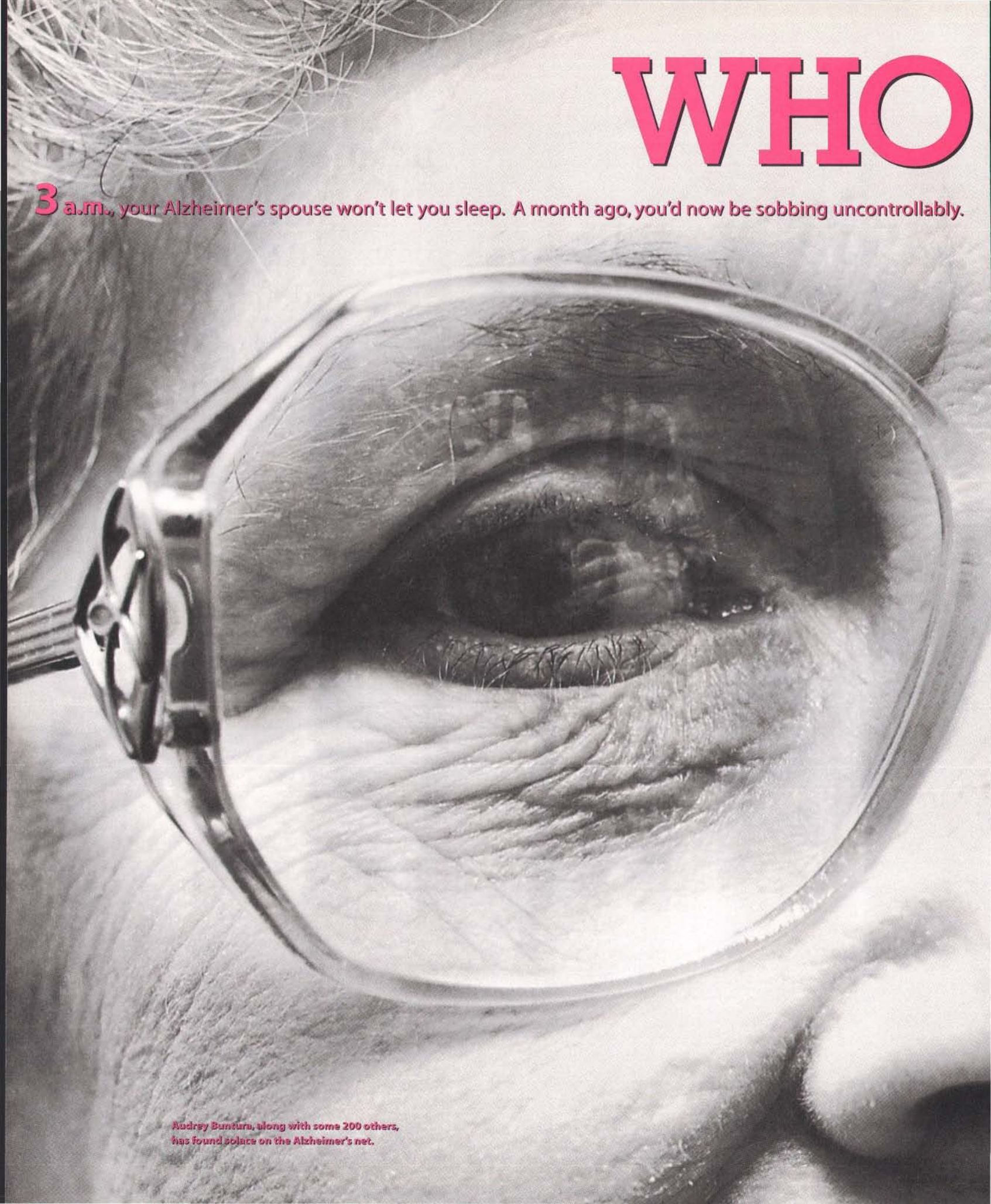
# WHO

3 a.m., your Alzheimer's spouse won't let you sleep. A month ago, you'd now be sobbing uncontrollably.



Audrey Buntura, along with some 200 others, has found solace on the Alzheimer's net.

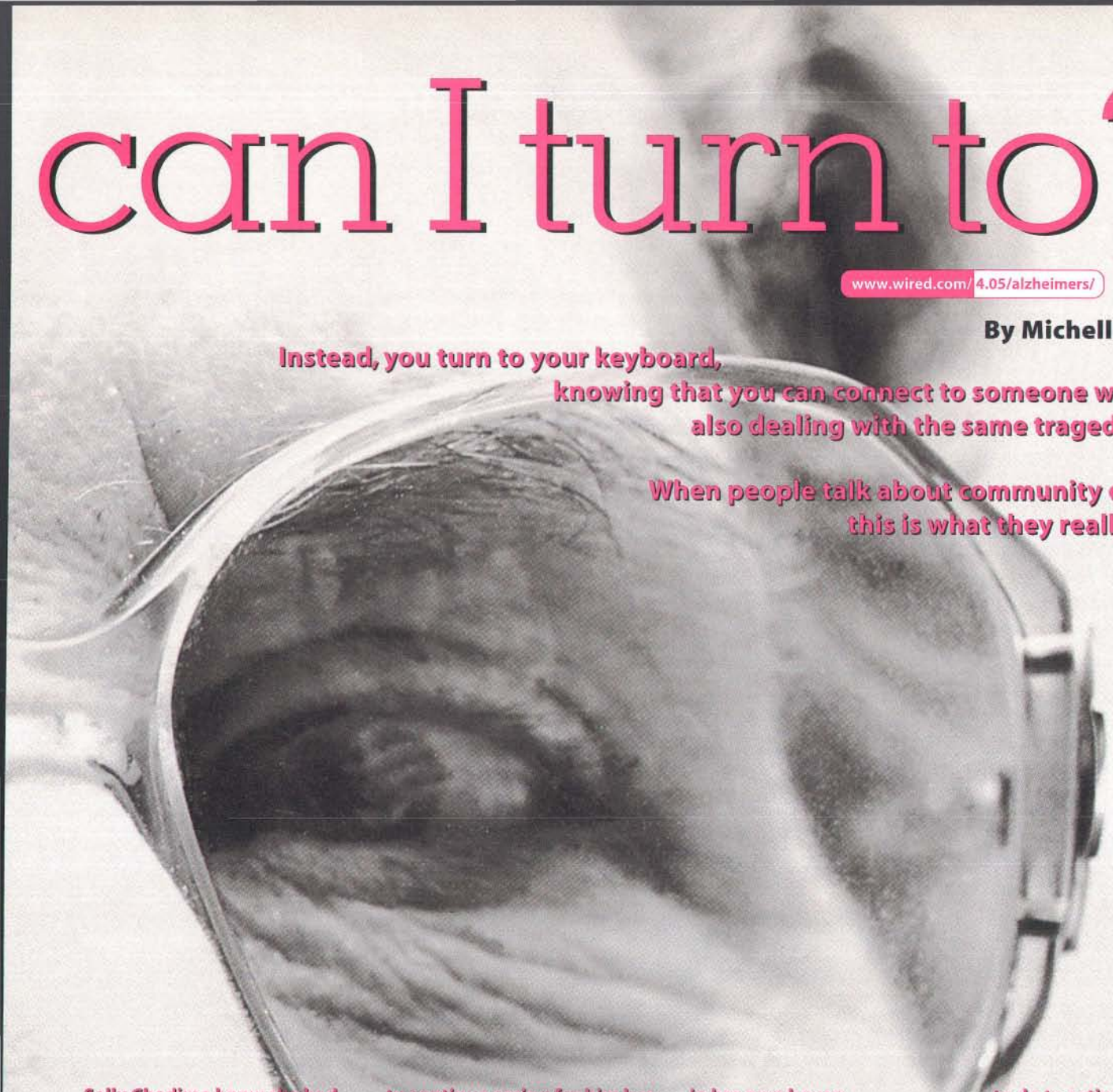
# can I turn to?

www.wired.com/4.05/alzheimers/

By Michelle Slatalla

**Instead, you turn to your keyboard, knowing that you can connect to someone who is also up, also dealing with the same tragedy.**

**When people talk about community on the Net, this is what they really mean.**



Sally Chadima knew she had a problem when she woke up one night to see Ed standing by the bed, holding a knife. He was very weak by then, so the slight, redheaded woman sat up and gently pried the weapon from the hand of her 200-pound husband. Then she tucked him back in. By morning, he'd forgotten.

Sally, however, couldn't forget. Alzheimer's disease had changed her husband of nearly 52 years from the sweetest man in the world into a stranger. Should she look for a nursing home? Or should she try to continue caring for him herself in their ranch house on the edge of Cleveland?

Then one day he lost his balance in the living room and lay on the floor for 15 minutes before she could get him to brace himself so she could lift him. She wanted desperately to ask someone for help: What should I do with my husband? But she was stuck in the house with Ed; once he got disoriented when he went out and wandered off in the grocery store. She didn't trust him alone, and with no one else to watch him, Sally had become a prisoner in her own house.

So that night, July 31, 1992, she prowled in her robe, restless, finally walking into the spare bedroom. She sat at the Wyse 30 terminal the social worker had given her.

Sally, a child of the Depression who'd raised two daughters while Ed worked as a truck driver, hadn't possessed this computer long enough to be comfortable with it. Her cat, Pepper, liked to perch by the monitor, as if the feline knew how to make the thing work better than Sally did. But Sally had learned that all she had to do to activate the 2400-baud modem was press the F1 key – the people at the Alzheimer's Association had programmed it to log her into the Cleveland Free-Net – and within seconds, she was connected to a whole world of people just like her, wives and husbands and daughters who were caring for relatives with Alzheimer's disease.

The first few times she'd logged on, she'd mostly made small talk, introduced herself, talked about her hobbies, such as how she liked to cook.

But tonight she typed:

> **Article #111**
**From: bl728@cleveland.freenet.edu (Sally Chadima)**
**Subject: FALLING**

Ed is getting harder and harder to handle physically and emotionally as the temper tantrums are getting worse, and I could do without the name-calling. He said he was going to tell the doctor that I pushed him to the floor. I know the time is coming when I will have to have him in a nursing facility, but I dread thinking about it.... If only his doctor would put him in the hospital, at least for one or two days, I would have him transferred to a nursing home from there, because I just don't know how I could do it directly from home. Linus – HELP ME!!

**She hit Enter and felt as if she'd poured out all her emotions. Now she could sleep.**

**Across town, up in Rocky River in the house Linus Gottas and his wife, Ruth, built after he returned from a World War II stint in the Aleutian Islands, Linus sat at the desk in his small den. At 73, he still was wiry, his face sunburned from biking as much as eight miles a day in almost any weather. He took the plastic dust cover off his computer – the machine he had once said "wouldn't fly" with a bunch of old people who thought a typewriter was getting fancy – and read Sally's message. He knew exactly what she was feeling. The retired insurance salesman had placed his wife, Ruth, in a nursing home in 1989. He typed:**

> **Article #114**
**From: cb165@cleveland.freenet.edu (Linus A Gottas)**
**Subject: Re: FALLING**

Reading your various messages two things stand out real strong to me – your sense of humor and your LOVE for Ed.... With me I didn't have the luxury of the hospital making the decision for me. She went from our home to the NH. This was positively the most difficult and heart-wrenching decision I ever made ... I went "to pieces – fell apart at the seams...." As I look back ... I am more and more convinced the decision I made was best for both Ruth and me. I do have more QUALITY time w/her, I am more relaxed, no longer have the taxing physical demands on me that were beating me down. By the same token, emotional hurt is not gone – it is there, but I think I am handling it. Ruth enjoys my visits, she's getting more care than I was able to give her at home. Linus.

**In another neighborhood near the airport, Audrey Buntura stayed up late in the solid bungalow she and her husband had moved into nearly 38 years earlier. She and Frank never had children, so after he went to a nursing home in early 1992, it was lonely at night. But she took comfort in the fact that she had made the right decision.**

**Sometimes late at night, she would put on her white slippers with the open toes and blue-and-pink embroidered scallops across the top, pad over the worn spot in the floral carpet in the front bedroom, and settle down at the computer.**

> **Article #123**
**From: cb169@cleveland.freenet.edu (Audrey Buntura)**
**Subject: cb165**

I of course said, "Frank's not ready for one yet. After a while I will go and look." Then all of a sudden, the day was there, and ... on the way home that evening, boy, talk about someone being down. Wow, I was at my lowest (I thought at that time).... Believe me, I was sure alone. For Frank wasn't my Frank, and I was hoping it was a dream, or should I say nightmare. It was awfully hard for a while, and still is, but as Linus says, you do have more quality time with them and yet you do get some respite. And I can imagine just how much you need it, Sally.... Maybe someday we can get together. I live in Parma. I love you all and keep smiling. – Audrey :-)

**That summer of 1992, the three of them – Sally, Linus, and Audrey – became confidantes long before they ever met in person. These people weren't Net-happy surfers, hardware-obsessed technogeeks, or alienated teenagers looking for a cheap way to download dirty GIFs. The computer, for them, had become a tool more powerful and important than their telephones. They could**

Sally Chadima is one of millions of family members who have wrestled with the question, "Home or institution?"

Alzheimer's appears in some as young as 40, though it usually afflicts people over 65. Above, Marian Wright with her mother.

PHOTOS: NICHOLAS NIXON

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***Michelle Slatalla*** **(mslat@echonyc.com)** ***is co-author of*** **Flame War,** ***to be published by Morrow in September.***

catch up on conversation when it suited them – at 3 a.m., if they wanted – and respond to other caregivers' messages when they weren't distracted.

Linus was an efficient and organized man – "my Teutonic background, I guess" – who liked to travel and adhered to a rigorous exercise program to combat the effects of one heart attack and a triple bypass surgery. Besides the regular bike trips he took in Europe and Connecticut, he and Ruth had visited friends and relatives as much as possible before she got claustrophobic on airplanes.

Audrey liked to do things to help people; she made 19 kinds of homemade cookies around Christmas time, and kept the house clean enough to eat off the floor. When, at age 62, she was laid off from her job at Metal Source, a local steel service center, Audrey called it a blessing in disguise, because now she could take better care of Frank.

And Sally? She loved a good laugh, made light of things to make herself feel better, could even turn her husband's memory loss into a joke. She called him "The Magician" because he "made things disappear" around the house. One of the things she had loved most about Ed was his good humor.

As a young girl, she'd met him at a party at her house, back when "the guys and gals got together to play and sing, and my house was the only one with a player piano," she remembers.

When the Wyse terminals were installed in the caregivers' homes, the three found they suddenly had a 24-hour-a-day support group. After years of feeling locked up at home, where they kept unrelenting watch over failing spouses as their own lives narrowed and friends disappeared, they had a place to turn – and a new group of people to talk to which was enduring similar predicaments. Alzheimer's, a progressive and fatal disease that attacks the brain, often causing violent behavior, afflicts 4 million Americans. But it also strikes unusually hard at the patients' loved ones, shackling the caregivers to their own homes.

Offline, Sally and Linus and Audrey had been stuck – and alone. But online, they were connected, could thrash out any problem, get heartfelt encouragement any time they needed it. The computer, as Linus puts it, "became my lifeline. If someone came up to me and said they were going to take it back, I'd say, 'Take my left arm instead.'"

Sally and Audrey and Linus would have laughed, they say now, if they had heard about the experts' doubts that the Alzheimer's Disease Support Center's fledgling online project would succeed.

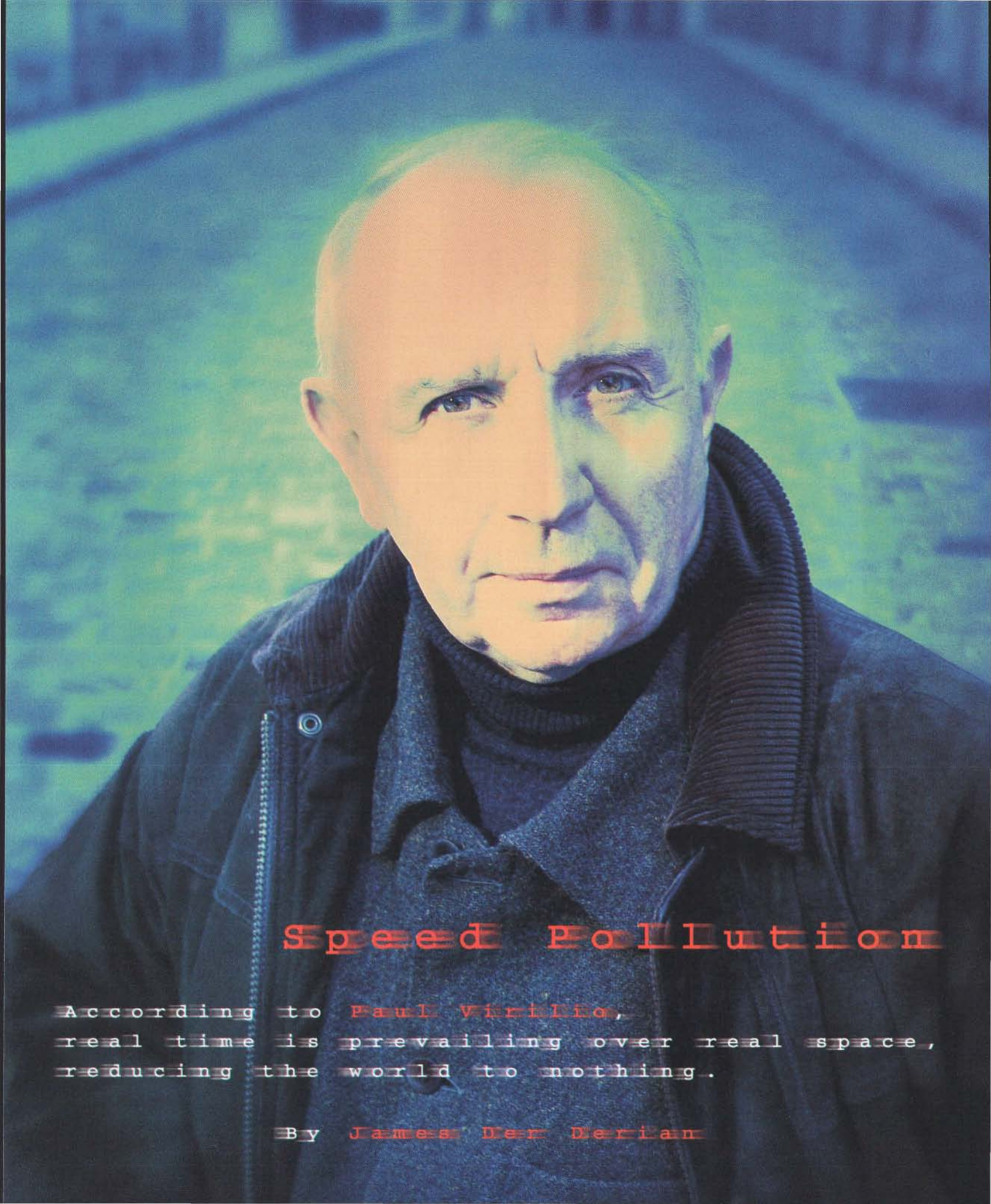
"Some social workers said this would isolate people. 'If you put computers in people's homes,' they said, 'they won't go to support groups,'" remembers Sue Kacerek, the social worker and program specialist at the Cleveland chapter of the Alzheimer's Association who helps manage the program. "But people like Sally and Linus and Audrey proved them wrong."

In 1995, in fact, the National Information Infrastructure Awards – a program sponsored by a coalition of public and private organizations including Sun Microsystems, Netscape Communications, AT&T, and others – gave its first annual Community Award to the online project. Chosen from nearly 150 entries as the best at increasing citizen participation in community life, the Alzheimer's online project "exemplifies what it means to live in a networked society," says Scott Bascon, a principal of Access Media Inc., a Santa Monica, California, company that created and organized the awards. "Here, we have lives enriched. Here, technology is used to break down some very difficult barriers."

Back in the mid-1980s, when the newly created Alzheimer's Center at University Hospitals of Cleveland hired Kathleen Smyth, a researcher 184 ►

Linus Gottas, above, visited his ailing wife daily in a nursing home. There is no known cure for Alzheimer's.

Wright, above, with family friend Don, turns to the Alzheimer's network to alleviate the isolation of being trapped at home.



# Speed Pollution

According to Paul Virilio, real time is prevailing over real space, reducing the world to nothing.

By James Der Derian

**Wired: Is the author dead?**

**Virilio:** Written work is threatened by the evocative power of the screen, and in particular the live screen. Though not by the image – there have always been images in books; there have always been images in architecture, like frescoes or stained-glass windows. It is real time that threatens writing. Writing is always, always, in deferred time – always delayed. Once the image is live, there is a conflict between deferred time and real time, and this is a serious threat to writing and the author.

**Is that why you write about film?**

Cinema interested me enormously for its kinematic roots – all my work is dromological, related to the study of speed. Inevitably, after having treated metabolic speed, the role of the cavalry in history, the speed of the human body, I became interested in technological speed. It goes without saying that after relative speed (the railroad, aviation) there was absolute speed – the transition to the limit of electromagnetic waves. Cinema interested me as a stage in between, the putting into movement of images.

**Has this shift changed the nature of war?**

Of course. It changes the logistics of perception. In war, the logistics of perception was from the start a geographic logistics of domination from an elevated site – the tower, the telescope, the fortified castle, or the level of perception of the bombardier. The development of the battlefield corresponds to the development of the field of perception made possible by technical advancements: the technologies of geometrical optics, the telescope, waveoptics, electro-optics, the electromagnetic transmission of a signal in video, and, of course, computer graphics, the new multimedia. The battlefield is no longer "worldwide," in the sense of the First or Second World War. It is global, in the sense of the planet.

**Was the Gulf War the first global war?**

The Gulf War was a fractal war: at once local and global. With regard to its battlefield, it was a local war – without many deaths, without many consequences – in comparison with the Second World War. But it was a worldwide war on the temporal level of representation, on the level of media. In fact, it was a war that took place in the artifice of television much more than in the reality of the field of battle. One can already say that real time prevailed over real space.

**In your writing, wartime seems to prevail over all time.**

I am a "war baby." As a child I lived through the horrors of the Second World War, through the reign of technology as absolute terror. I was in Nantes, which was destroyed by our allies – the Americans and the English. For a child, a city is like the Alps, it's eternal, like the mountains. Then one single bombardment and all is razed. War was my university.

**What about the impact of technology on culture?**

There have been three industrial revolutions. The first important revolution on the technical plane was that of transportation. The second, which was almost concomitant, was the transmissions revolution, including Marconi, Edison, radio, television. The third, which we are on the verge of, is the revolution of transplantations. All these technologies of telecommunications that had been employed in aviation and missiles favor nanotechnology – the possibility of miniaturizing technology to the point of introducing it into the human body. Just as the geographic world was colonized by means of transportation or communication, we have the possibility of the colonization of the body by technology – as if we had the city in the body and not the city around the body. We are on the verge of the biomachine.

**When hardware and wetware merge, are there any ethical choices left?**

I believe that the three revolutions lead to a technical fundamentalism, a "cybercult." Just as there is religious fundamentalism, there is a technical fundamentalism. Modern man, who killed the Judeo-Christian God, the one of transcendence, invented a god machine, a deus ex machina. But it's necessary to be an atheist of technology! This is not simply antitechnology. My fetish image is that of the battle of Jacob and the angel. Jacob is a believer, he meets the angel of God; but to remain a free man, he is obliged to do battle. It is necessary to obey – but also to resist.

**What comes next?**

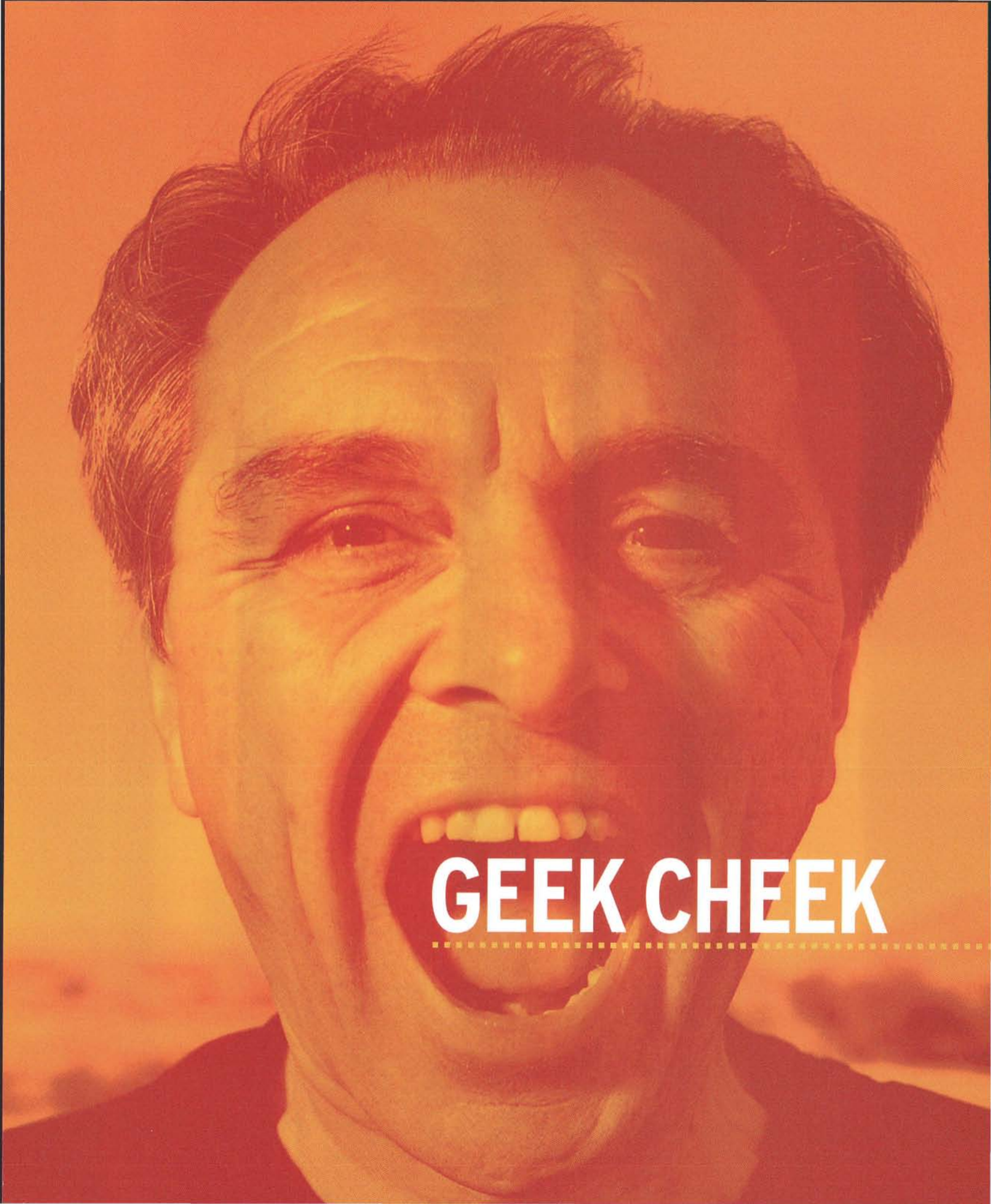
I think that the infosphere – the sphere of information – is going to impose itself on the geosphere. We are going to be living in a reduced world. The capacity of interactivity is going to reduce the world to nearly nothing. In fact, there is already a speed pollution, which reduces the world to nothing. In the near future, people will feel enclosed in a small environment. They will have a feeling of confinement in the world, which will certainly be at the limit of tolerability, by virtue of the speed of information. If I were to offer you a last thought – interactivity is to real space what radioactivity is to the atmosphere. ■ ■ ■

**Over the course of a diverse career as professor of architecture, film critic, urbanist, military historian, peace strategist, and intellectual provocateur, French author Paul Virilio has produced more than a dozen books. His writings move with a rare fluidity from the quotidian (train wrecks and city planning) to the exotic (stock market crashes and the ultramodern war machine). Since writing his first book, *Bunker Archeology*, a study of Hitler's "Atlantic Wall," Virilio has gone on to crisscross the circuitry of modern thinking with genre-busting studies of the impact of speed on politics ("the dromocratic revolution") and the co-evolution of war and cinema ("the logistics of perception"). Turning his corrosive intellect to the impact of technology on war, the body, and the media, Virilio pierces some of the darker veilings of the future. James Der Derian met with Virilio in Paris.**

*James Der Derian* (jderian@polsci.umass.edu) *is editor of the forthcoming* Paul Virilio Reader *(Blackwell Press) and author of "Cyber-Deterrence," in* Wired *2.09.*

*Translated by James Der Derian with Lauren Osepchuk and Michael Degener.*

IMAGE: STEVE DOUBLE (DOUBLEX@CITYSCAPE.CO.UK)



# GEEK CHEEK

# TODAY, WHAT'S MAKING JEAN-LOUIS GASSÉE'S NIPPLES HARD ISN'T APPLE, IT'S HIS ULTIMATE BOY TOY, THE BEBOX.

**By David Diamond**

**Photographs by William Mercer McLeod**

Most people don't start getting interesting until you've spent eight hours with them in a car. With Jean-Louis Gassée, it happens 92 minutes into our trip to check out the natural mud baths in Nevada's Black Rock Desert. It's somewhere near Sacramento, just before dawn, when Gassée, the former president of Apple Computer Inc.'s products division, begins reminiscing about what he refers to as his "psychosocial moratorium." That's the time between his mathematics studies and when he "reentered society."

He's doing 85 mph in his wife's white Mercedes SEL and he drifts back to the early 1960s: His father's financial misfortunes had forced him to drop out of graduate school at Paris's Faculté d'Orsay, so Gassée took a series of temporary jobs. He was a maître d' at a Montparnasse strip joint, now a pizza place. "One day a beautiful black woman was doing a sadomasochistic strip act to nice music, 'I Put a Spell on You,' by Screamin' Jay Hawkins. We all had white coats with napkins on our arms. I hear a commotion. I turn around. Right behind me a drunk is leaning over on the bar. He whipped his thing out and was peeing on the head maître d'."

Another, more relevant job involved selling royal jelly door-to-door. For the uninitiated, royal jelly is the hormone-rich secretion that worker bees feed to larvae to make them into queens. "I would sell it to spouses, telling them it would reinvigorate their husbands," he says, lifting his hand from the steering wheel long enough to adjust his glasses and laugh in advance of the punch line. "And I would sell it to the husbands and say, 'It will reinvigorate you.'"

I use the word relevant because these days Gassée is peddling what some might view as the technical equivalent of royal jelly – a new computer and operating system designed, in the Frenchman's own words, "for people who like to lift up the hood." The BeBox, which made its début

# "AFTER BEING A CORPORATE ASSHOLE FOR SO MANY YEARS, I THOUGHT IT WOULD BE A GOOD IDEA TO SEE THE OTHER SIDE OF THE WORLD."

in October, is a high-performance machine designed, according to the bright phrasing of a Be Inc. press release, "to meet the demands of sophisticated computer users and developers who are frustrated by the limitations of current architectures." At a stripped-down price of US$1,600 (no monitor, no mouse, no keyboard), it is "the first true real-time, object-oriented system that features multiple Power PC processors, true preemptive multitasking, an integrated database, fast I/O," and a host of other features that promise to reinvigorate wimps on Windows.

It sounds promising, like a new beginning. There had been reports of a standing ovation when Gassée first demo'd the computer last fall at the Agenda industry conference in Scottsdale, Arizona, and polite endorsements began trickling in from the likes of Marc Andreessen, who was quoted as saying that both the Windows 95 and Mac operating systems were showing signs of age. Stewart Alsop wrote that the BeBox was "a machine that represents what [Apple] should be selling today" and that it "will probably end up being the ultimate World Wide Web client." Gassée's first round of backers includes folks and companies that any ambitious Silicon Valley upstart would die to have on speed-dial: Seymour Cray, execs at Hewlett-Packard, AT&T, Groupe Bull.

To celebrate this new beginning, I proposed to travel with Gassée to a place that somehow held for me the promise of spiritual renewal: Death Valley at dawn. He wanted something a bit closer to his Palo Alto home. A friend suggested the Black Rock Desert, where 3,000 attendees of The Burning Man Festival had weeks earlier frolicked nude in the natural hot springs and mud baths. It's near the site in the northwestern Nevada salt flats where the land speed record had been set in 1983. J.-L. emailed back that Black Rock, a 12-hour round-trip, sounded "intriguing" – provided we returned by 6 p.m., time enough for him to make an art show benefit for his kids' school that featured paintings by his wife, Brigitte.

When he pulls his wife's car into the agreed-upon San Mateo parking garage at precisely 4:30 a.m. on a crisp Friday morning, Gassée, who typically rises at 5:30, is full of cheer and enthusiasm, calling us "Silicon Valley's Merry Pranksters." I am coming off two hours of sleep and feel like shit. I throw a couple of towels and spare underwear into the trunk and settle into the passenger seat. (We don't take his car, a convertible Mercedes 500SL, because it won't accommodate the photographer accompanying us.)

Within moments, we are zipping out of San Francisco through the Bay Bridge maze and Gassée is telling me that he sees himself as "a mathematician and a peddler" and that "after being a corporate asshole for so many years, I thought it would be a good idea to see the other side of the world" – the sort of banter I would find charming at a reasonable hour and with a sufficient blood-caffeine level. Fifty-two-year-old Gassée wears jeans and a black T-shirt

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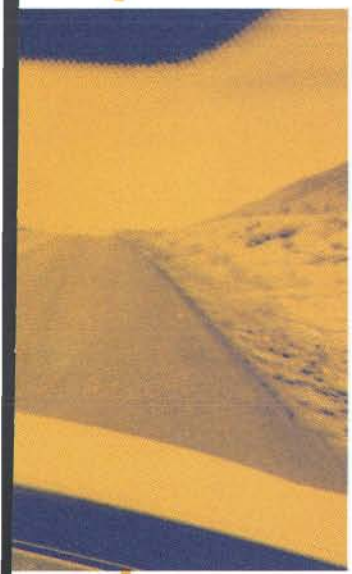
*David Diamond is West Coast editor of* Fast Company *magazine. Reach him at* ddiamond@well.com.

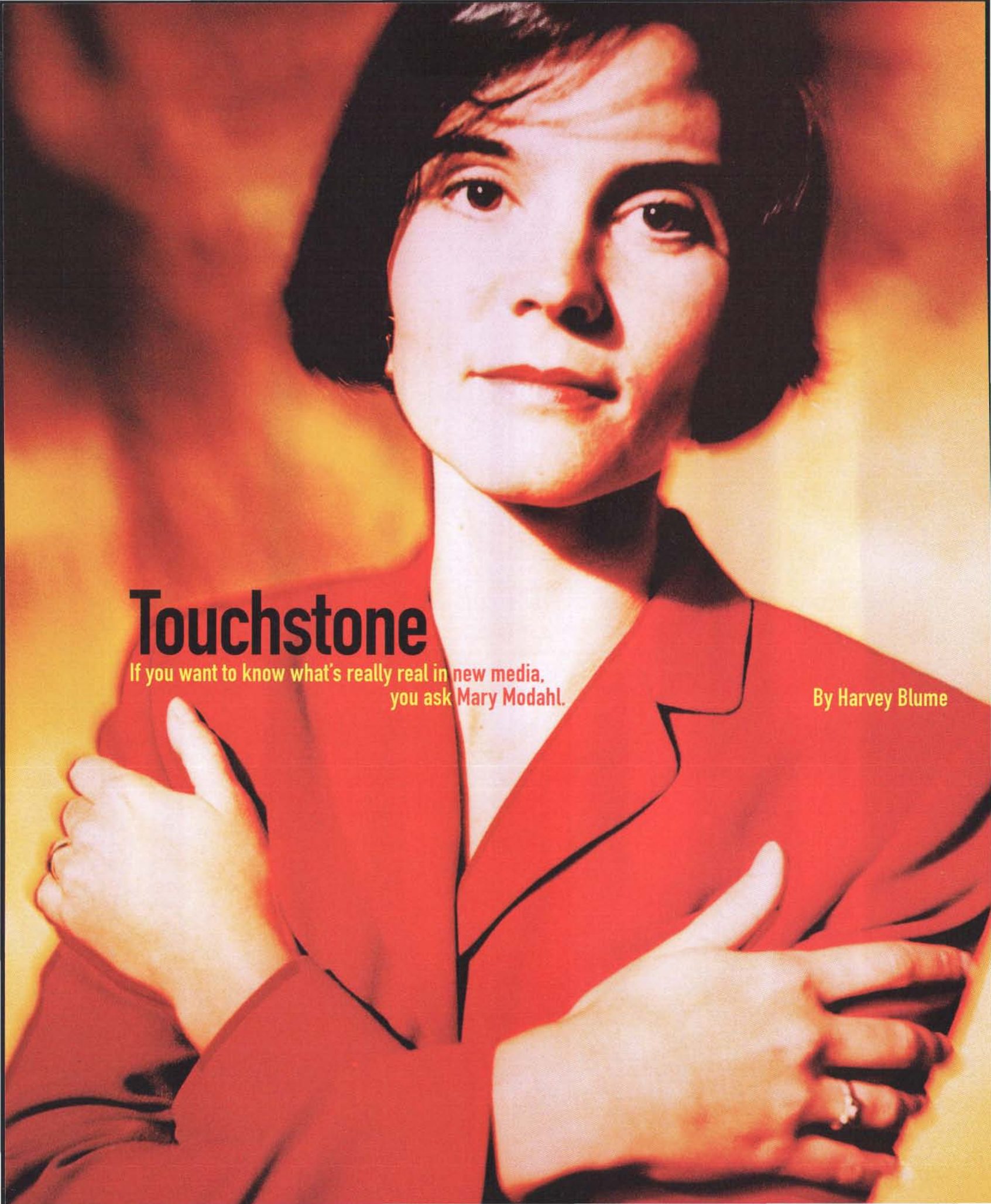


with the word *Be* in Times Roman type, which is eerily reminiscent of ITC Garamond, made famous by Apple. He gets a tad defensive at the veiled suggestion that perhaps he is imitating his former employer.

The Man Behind the BeBox had been described to me with words like "flamboyant" and "outspoken," and I have been forewarned that one of his favorite – if not most quotable – sayings is "That makes my nipples hard!" But in the predawn darkness, as he leaps into a description of the nuts and bolts of his five-year-old company, the monolog seems painfully scripted. Gassée talks about how BeBox is designed to accommodate the growing requirements for digitized audio and video, how the company uses the Web to attract developers who will write applications for the operating system, how his dual Power PC processors are more effective at a lower price than Sun and Silicon Graphics workstations. And how he is counting on another round of financing of $7 million to $8 million on top of the $9 million initial round. (He invested $1 million of his own; after the second round, he expects to have 20 to 22 percent interest.) Why reduce your stake? I ask. "Even if I have 51 percent of the *Titanic*, it's still a sinking ship," he says, using a Frenchman's gestures. And he talks about how, when a venture capital backer asked what he'll do after he saturates the "geek" market, which Gassée estimates at 4.5 million units, the Frenchman told him, "We'll sell them a second computer."

"If you ask people in the mainstream what they want, they'll say faster and smaller and cheaper," he says, as a gentle snore drifts from the lips of the photographer in the leather backseat. "But with that you don't get innova- 190 ►

**For Gassée, the BeBox marks a new beginning. Our road trip to the Black Rock Desert promises spiritual renewal. Instead, we find overflowing garbage and polluted hot springs. His wife's white Mercedes really rips on those Nevada salt flats, though.**



# Touchstone

If you want to know what's really real in new media, you ask Mary Modahl.

By Harvey Blume

**Wired: Will the Internet collapse under the weight of its own success?**

**Modahl:** So far as Wall Street goes, you're going to see a certain sobriety take over, an end to what has been called momentum investing. But will the Internet be brought down under its own weight? Not at all. The move to commercialization means there's a very significant build-out of the Internet by companies who want to offer a service. That will result in a considerably more reliable network.

**What's the most the Web can turn out to be? What's the point of fizzle?**

Right now it's like a neutron bomb went off on the Web. All the buildings are there, but you don't have a sense of people the way you do in online services where there's an aliveness, a sense of others. The way-out vision for the Web is that when you go to a site, there will be people. You sense them, they sense you. It's a social experience, like walking into a store. Right now, it's like looking at signs and billboards.

It could be like AOL's instant-message features, it could be avatars, it could be 3-D, 2-D, or even print, but when you get to a Web site, you want to know who's there. You want to be able to meet your friends.

**You wrote that Web commerce today amounts to "a dozen pizzas, two or three flower bouquets a week, and a dozen subscriptions," but by the year 2000, there will be US$7 billion in sales. How do you get from two pizzas to $7 billion?**

Pizza prices soar! No, the thing to keep in perspective is that $7 billion is diddly when we're talking retail sales. Retail sales in the US are more like $5 trillion. Catalog sales are $53 billion.

You're going to see travel purchases increase. You're going to see a lot more software and hardware sold online. We're also optimistic about grocery-shopping services like Peapod. Grocery bills typically range from $100 to $200 a week. Less than 20 percent of the online population will do their shopping online, but those who do will spend a lot, from airline tickets to groceries.

**Will advertising play a major role on the Net?**

Advertisers are willing to spend on the medium. There will be 33 million people in the US on the Internet by the year 2000, and some projections are much higher. This is an upper-income demographic, more educated than average, more likely to have children. It's the demographic that most consumer-goods companies want to talk to most.

How they do that needs to be examined. New models need to be explored. And that's where content smashes together with advertising. In the early days of television, there was a Geritol-sponsored game show. On the Web, we may see the Doritos content site.

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*Harvey Blume* (joel@ai.mit.edu) *is a critic and co-author of* Ota Benga: The Pygmy in the Zoo.

**If the Net gets better for business, will that come at the expense of personal expression?**

The possibility of the Internet supporting a new art form is huge. I don't think the presence of business will interfere with that any more than the presence of Citicorp prevents the East Village from existing.

**Will dumb, Internet-only terminals replace PCs?**

I think it's a dumb idea. Just producing a $500 computer that does anything useful has proven to be extremely difficult. And videogame-machine producers will tell you that even at $300 you enter a pricing abyss, where consumers just don't want to buy.

**Will expanding bandwidth make real-time phone service commercially viable over the Internet?**

No. Real-time voice is a hobby, like ham radio, not a permanent application. As a packet-switching network, the Internet just isn't matched to voice streams that need continuous connection to run well. Anyway, the phone system works – why fix it?

**When you write that "vices such as pornography, gambling, and money laundering" flourish on the Internet, does that mean you are calling for censorship?**

I don't think government censorship can succeed. They can pass laws, but enforcement will be very difficult. I think you will begin to see the equivalent of red-light districts, centers of the Internet understood to be pornographic, so that people can stay away or lock their children out if they want to. Search tools and indexing can provide a clear delineation between red-light and green-light sites, so you can stick to your side of the street.

**Should government subsidize telecommunications as a way to boost the economy?**

It's very important for government to look at the Internet as a national strategic asset with about a $100 billion impact on the economy. But in the United States, subsidy is unnecessary. The competitive activity in the industry is very high; the pressure on prices to come down is very strong. The scope of participation – new entrants as well as established players – is such that subsidy is not necessary here, though it may be in other countries.

**Speaking of other countries, why is there less furor about connectivity in Europe, less concern about getting wired?**

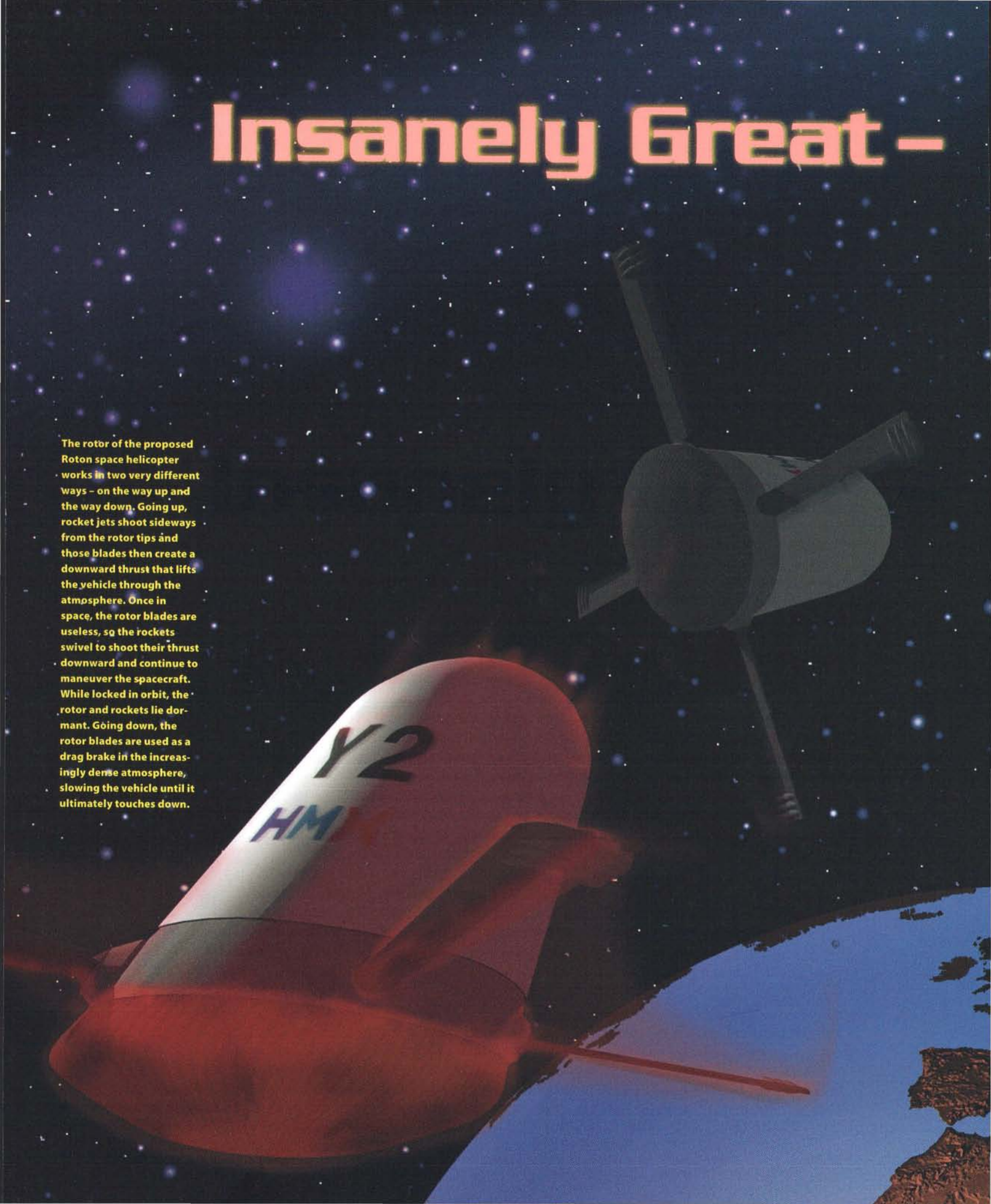
There is not a love affair with technology the way there is in the US. We're kind of like the Borg – the bizarre people on *Star Trek* who are half machine, half human. We are the Borg of the world community. ■ ■ ■

**It's becoming almost standard in reports on new technology to find a quote from someone at Forrester Research Inc., a rapidly growing research firm in Cambridge, Massachusetts. That someone, more often than not, is Mary Modahl, Forrester's group director, the author of *The Forrester Report on People and Technology*, and a woman whose views on new media are highly sought on Wall Street.**

**When I met Modahl, Forrester was about to expand once again. There was determined activity everywhere but nearly no unoccupied space. When we did settle down in a momentarily empty office, Modahl's conversational style regarding the future of the Internet turned out to be quirky, high-speed, and data rich.**

PHOTO: KEVIN MORRILL

# Insanely Great –




The rotor of the proposed Roton space helicopter works in two very different ways – on the way up and the way down. Going up, rocket jets shoot sideways from the rotor tips and those blades then create a downward thrust that lifts the vehicle through the atmosphere. Once in space, the rotor blades are useless, so the rockets swivel to shoot their thrust downward and continue to maneuver the spacecraft. While locked in orbit, the rotor and rockets lie dormant. Going down, the rotor blades are used as a drag brake in the increasingly dense atmosphere, slowing the vehicle until it ultimately touches down.

# or just Plain Insane?

## Could this rocket helicopter be the space equivalent of the personal computer?

www.wired.com/4.05/roton/

By Gary C. Hudson

**Gary Hudson wants to build an inexpensive helicopter powered with rocket engines that will lift tourists into space. "It's such a wacko idea," he says, "that I have a great deal of faith that no competitor will think it'll work." That sort of clears out the field. Hudson has spent 25 years as a maverick in the commercial space industry, including a long stint in the 1980s as founder and president of Pacific American Launch Systems Inc. For most of that time, Hudson tried to buck NASA and develop reusable single-stage commercial rockets, which look pretty normal. Then a few years ago, he came across this helicopter idea:**

About three years ago, my friend Bevin McKinney sat in a conference room at American Rocket Company, a business he co-founded, and told me about an idea he had. He wanted to build a space helicopter – a rocket ship powered by a huge propeller. My first reaction was to patiently say, "Bevin, that's insane."

My second reaction was to keep listening. The difference between "insane" and "insanely great" is often only a matter of shifting perceptions, something Bevin excelled in. Some of his earlier insane ideas – such as a hybrid liquid- and solid-fuel rocket that couldn't blow up – turned out to be insanely great.

For years both Bevin and I had been frustrated that space was the exclusive province of government space agencies and hero astronauts. We both wanted to go to space for the sheer fun of it and, in the finest capitalist tradition, make a few bucks along the way. Our careers had taken us, independently, in virtually the same direction. When we first met, we were competitors working on expendable commercial

**Consider the Roton a concept about space flight that uses a rotor, which can be integrated into various sections of the spacecraft, from the tip to the middle to the tail end.**

launch vehicles – throwaway rocketry. But we both believed that these expendable rockets were just the first step to achieving our real goals of opening the space frontier to the common man – in other words, ourselves.

**B**evin arguably had been more successful than I. He'd founded two rocket companies and had built and flown the Dolphin, a prototype of an expendable commercial satellite launcher. While I had gotten the first private launch vehicle in the US to the pad a few years before him, his actually worked. While I was working on ideas for inexpensive reusable rockets during the 1980s, Bevin was racking up successful firings of large hybrid rocket engines more often than anyone else. But, sadly, when we talked that spring of 1993, both our companies were being driven out of business by government-funded competitors. We needed an edge, and this time we needed to cooperate, not compete.

*Gary C. Hudson* (gchudson@aol.com) *was the designer of the first privately funded space launch vehicle built in the US. He has teamed up with Bevin McKinney to develop the Roton. Their new company is called HMX Inc.*

**C**ontrary to its image, the aerospace industry is hidebound, with scant reward for innovation. Little has changed in fundamental rocket technology since the V-2 rockets were flown 50 years ago. Much of that is due to the politics played within NASA, within the private sector industry, and within Congress. It's in the interests of many of these players to keep expensive, multistaged rockets as the norm.

**T**hat political environment changed somewhat after the *Challenger* exploded, but commercial rocketry still has had a hard time getting off the ground. In my view, it's because the roots of rocketry were not in air transport but in artillery. Today's American commercial launchers are all derived from military ICBM technology. Throwaway rockets became the only way to go to space. But imagine throwing away an airliner after a single flight: the price of a ticket would be – pardon the pun – astronomical.

**A**s far back as 30 years ago, a few brave souls began offering an alternative idea: the single-stage reusable rocket or spaceship. They weren't talking about what became the US space shuttle because that vehicle uses multistage boosters and a throwaway external tank to get into orbit. These ideas, including a few of my own, eventually led to the government's successful DC-X program, now segueing into the X-33 near-orbital reusable launch vehicle. Developed in only 18 months for 10 percent of the cost of a single space shuttle flight, the DC-X went a long way toward demonstrating the promise of a reusable, affordable, single-stage spaceship that eventually could carry humans.

**A**s I sat in that American Rocket conference room absorbing Bevin's wild notions about a rocket with a propeller, I began thinking that maybe his idea held the most promise yet. This idea just might make the transition from "insane" to "insanely great." He'd even come up with a cool name for his spaceship, full of sound and maybe a little fury. The Roton.

## Spinning into space

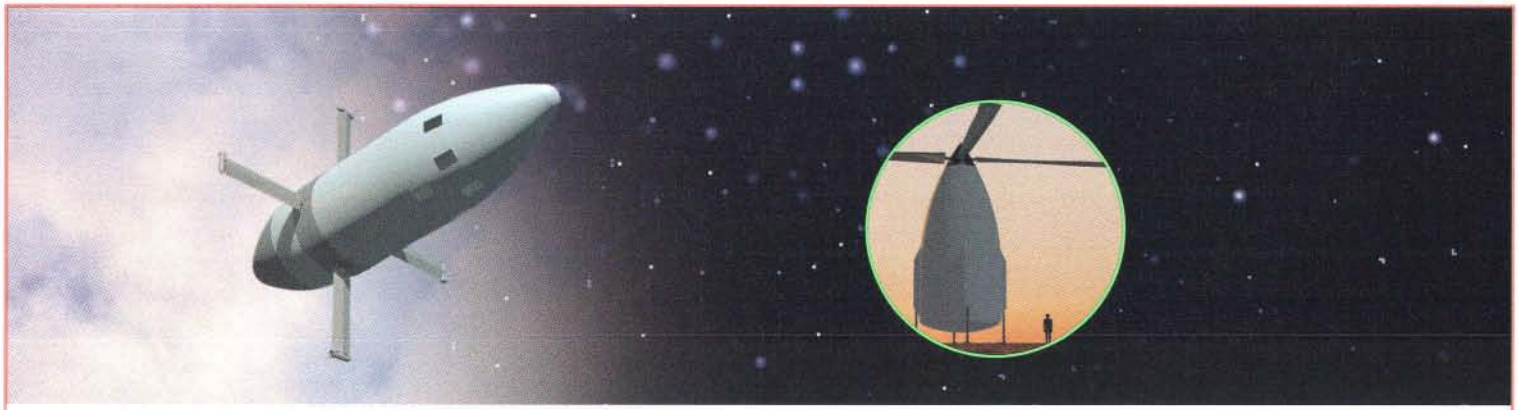
**R**eusable rockets need both high-performance engines and very lightweight structures. Bevin proposed to cut weight by putting a rocket engine at the tip of each of the four rotor blades, using the rockets to shoot horizontally and spin the blades. The spinning rotor blades would create a downward thrust that would provide lift. The rotor would maximize the efficiency of the rocket thrust, which normally just exhausts downward.

**T**his increased performance would – in rocket engineer terminology – "pay for the weight of the rotor." The Roton also promised to reduce takeoff noise substantially, because the vehicle would require only a fraction of the rocket thrust at liftoff, and the rotor would be generating thrust more efficiently than a conventional rocket at lower altitudes.

**A** key function of the spinning rotor would be to siphon propellant into the engines at very high pressure. (This takes advantage of a simple principle of hydrodynamics that you can prove by standing on the roof of a two-story building and dropping a garden hose into a 55-gallon drum of water on the ground. Swing the other end of the hose over your head like a lariat and you'll drain the drum dry.)

**T**hese high pressures were previously achieved only by using very expensive, very heavy pumps driven by hot engine gases. Eliminating engine pumps, in rocketry terms, is heavenly. Any weight saved in building an engine is a compounded saving. A sig-

IMAGES: INTRO SPREAD: MICHAEL CRUMPTON ; INSETS: TOM BROSZ



**Using rotors would do away with the need for elaborate launching pads because the initial rocket thrust would shoot sideways – allowing takeoff almost anywhere.**

nificant portion of the propellant a spaceship carries is used just to lift the engine, so that the less engine weight, the less fuel it needs to carry; thus the less engine it needs, the less fuel it needs to carry – and so on.

**O**nce it runs out of atmosphere, the rotor could no longer provide thrust to push the vehicle along the trajectory to orbit. At this point, the rockets at the rotor tips would swivel to point their exhaust thrust backward. Of course, the rotor would have to continue to spin even without air, otherwise there would be no pumping power to feed the engines. A tiny fraction of that thrust would be deflected to the side to spin the propellers. Still, overall, you'd save on propellant because the high performance of the rotors in the atmosphere would more than compensate for the need to spin the rotor in space.

**B**evin was not the first to propose putting rockets at the tips of helicopter blades. Others had kicked around the idea and a few experimental helicopters had been built. But nobody had ever suggested building a vehicle capable of powering itself all the way into space. Likewise, Bevin borrowed some ideas about using a rotor during reentry. Engineers at Bell Helicopter and French aviation company Giravions Dorand had proposed using rotor blades as a "drag brake" to slow down reentering space capsules. NASA engineers had confirmed the concept with wind tunnel tests at the Ames Research Center in Mountain View, California, as early as the late 1960s.

**B**evin saw that the rotor would solve the biggest problem for any true spaceship: landing. The standard solution – retro-rockets for touchdown – does work, as demonstrated by the DC-X landing on rocket thrust at White Sands Missile Range in New Mexico in 1994. But retro-rockets have many problems: they need more propellant; they're very noisy; and, most important, you have to worry about whether they will fire up at precisely the right time. Waiting for that relighting enhances what test pilots quaintly call "the pucker factor."

**O**n the other hand, a low-speed rotor landing would be much less risky, far more quiet, and would consume less fuel. The spaceship would weigh less since the extra landing propellant needed in the final seconds of a flight wouldn't have to be carried all the way to orbit and back again.

**T**hat leaves the most frequently asked question about the Roton: wouldn't the rotor blades burn off in the atmosphere? The remarkable – and counterintuitive – answer is *No*. During the long climb into orbit, the atmosphere steadily decreases in density. The Roton starts out at very low speeds in the high-density atmosphere. As it picks up speed and climbs higher, the atmosphere thins out. The "dynamic pressure" (think wind) would actually be lower for the Roton than for many high-performance aircraft, including fighters.

**D**uring reentry, the Roton would encounter a pretty benign environment as well. The Roton would start out at high speeds, but the atmosphere would be very thin. As the atmosphere becomes more dense at lower altitudes, the rotor would slow the vehicle down. Also, the load on the blades would be rather small because most of the propellant would have been consumed – meaning more than 90 percent of the overall weight would be gone. Wind tunnel tests have shown the heating would be no worse than that experienced by the space shuttle or other reentry vehicles.

## Stumbling blocks?

**O**K, so the Roton is a nice concept, but could a bunch of engineers on a budget really go out and build it?

**Y**es. The key to Roton development is to use inexpensive technologies already created by the homebuilt-aircraft community, known in the industry as "homebuilders." Right now thousands of homebuilders are producing sophisticated flying machines in their garages by using graphite-epoxy composite materials, modern electronics for both design and onboard avionics, and an abundance of innovation. These craft range from copies of World War I fighters to personal jet aircraft.

**I**ndeed, a whole industry has grown up in the shadow of the military-industrial aerospace complex. It's led by people like Burt Rutan, whose Scaled Composites Inc. has produced everything from the body of the GM Ultralite automobile to the aeroshell of the DC-X experimental rocket. Today sophisticated amateurs and interdisciplinary professionals are leapfrogging the tottering space establishment.

**T**he Experimental Aircraft Association, representing these homebuilders, reports that more than half a million

aviation and space enthusiasts show up each year in Oshkosh, Wisconsin – the Woodstock of homebuilders. For 8 days the little airport at Oshkosh becomes the busiest in the world. Almost certainly someone in that crowd is already thinking about building a personal rocket.

**I**n this environment, developing a working Roton becomes easier. A Roton could use the high-tech materials already developed by the homebuilders is no way to land an expendable missile after liftoff, it must be tested to orbit on its one and only flight. Because of the cost of these missiles, they rarely fly more than one test flight before carrying a paying cargo. In contrast, aircraft routinely take dozens if not hundreds of test flights.

**A** prototype Roton could be developed for tens of millions of dollars instead of the tens of *billions* of dollars it took to develop the space shuttle. Within 10 years, an off-the-shelf Roton might cost no more than a light private jet – between US$5–10 million.

**Within 10 years, an off-the-shelf Roton might cost no more than a light private jet – and be just as safe to operate.**

market. It could use low-cost aviation kerosene and cryogenic oxygen liquefied from air. It would require no launchpad, since no rocket thrust would ever touch the ground. No longer would vast, overpriced, government-owned launch sites be required. Any small county airport should do.

**T**he early Rotons may well be flight-tested with a human crew onboard or possibly be tele-operated from the ground. The vagaries of flight testing generally require the intuitive response of a human pilot, whether it's one sitting in a cockpit or controlling the vehicle from a virtual reality terminal on the ground. This human involvement in flight testing will speed development, as it allows incremental testing: first flying the vehicle in hover, then up through Mach 1 and, finally, after many test flights, into orbit. This is how airplanes are tested, but it's dramatically different from missile flight tests. Since there

**S**afety? A reusable Roton should be as safe to operate as a small business jet – mainly because it will have redundant systems comparable to aircraft. This is crucial to the Roton's development success and operational safety. Without multiple rocket engines and rotor blades, and redundant avionics, the Roton would likely have the same abysmal failure rate as other boosters – about one in twenty of those never makes it into orbit.

**W**hat are the downsides? The Roton seems to have some size limitations. We'd probably not want to build a Roton with a rotor more than about 150 feet in diameter because of manufacturing and handling complexities. So the Roton seems destined to fly mostly light cargo. But this certainly could include ferrying people to space and back again. It is perfectly suited to the emerging opportunity of space tourism.

**A**s with any technology, one can imagine other concerns. A spectacular increase in spacecraft traffic might also increase atmospheric pollution or contribute to space debris. There are some who worry about exploitation of near-Earth orbit by terrorists or military powers. And, of course, like any transportation system, Rotons will crash, collide, and otherwise fail, leading to loss of life.

**B**ut the genie is out of the bottle. From an engineering point of view, the problems are essentially solved. The technology is in place, and someone is going to do it. If Rotons or their equivalents are not built and flown in the United States, then we can expect that they will be developed elsewhere. The only issue is whether or not the development will happen soon or be delayed by financial and bureaucratic impediments.

**C**ould the Roton be the space equivalent of the personal computer, challenging the mainframe-like expendable missiles of today? It could certainly go a long way toward making space accessible to many of us. And continuing the metaphor, it might make its inventor, and a bunch of third-party vendors, a little money on the side.

**S**itting in the American Rocket office three years ago, I thought Bevin was insane. Today there's still no doubt in my mind: this is an insane idea. But it's a great one – and it will work. ■ ■ ■

## VOWEL MOVEMENTS

**Takahiko Iimura left his native Japan in 1966 as one of the country's pioneering experimental filmmakers. Before the decade ended, he had settled in the US and was at the heart of the emerging conceptual art movement.**

**Thirty years later, Iimura is still experimenting – this time with his face. Using themes of cultural separation and the structure of language – a fixture of much of his work – he's created *A.I.U.E.O.NN. Six Features*, a seven-minute video installation (shown this year at The Kitchen in New York), which uses his computer-manipulated face to articulate Japanese and English vowels. Cartoonish expressions, flashing symbols, and exaggerated phonetic sounds project from six monitors creating an effect the artist describes as "comical and absurd." Iimura aims to inspire exploration of the relationship between these images and sounds and how they correspond to movement and space – a theme he discovered in the work of philosopher Jacques Derrida.**

**For those more confused than enlightened by all this, remember the words of McLuhan: "Art is anything you can get away with."**

**Be part of the experience at *www.inter-g7.or.jp/g4/newyork/art6a.html*. – *Jackie Bennion***

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***Jackie Bennion is a senior copy editor at* Wired.**

# SEX and DEATH among the Cyborgs

**Sandy Stone knows that eroding boundaries between us and our prostheses – contact lenses, implants, artificial organs, genetic engineering, communication networks – have already turned us into transhumans.**

The first thing you notice when you step into Allucquère Rosanne Stone's cramped, cluttered office at the University of Texas at Austin is the incredible range of interests she pursues. One look around the room and it's clear she takes the *multi* part of her work as seriously as the *media*. The walls are covered with posters promoting events she has been involved with – cyberspace conferences, architectural symposia, dance performances, art exhibitions, concerts, film festivals, and feminist gatherings. UFO stories clipped from tabloid newspapers compete for wall space with images culled from *Tank Girl* comics, and quirky pop-cultural artifacts litter every available centimeter of horizontal surface area. Sandy (as she's known in all but the most formal contexts) directs the University of Texas ACTLab, the radio-television-film department's interactive multimedia laboratory.

Right above her desk is the jacket art for Sandy's new book, *The War of Desire and Technology at the Close of the Mechanical Age* (MIT Press). The book has burned up the charts, relatively speaking, for such an unapologetically cerebral piece of prose. It's as eclectic and searching as the fragments of life she plasters across her office walls. "Not a traditional text, but a series of intellectual provocations," the blurb on the cover warns us. Translation: the book is wild – a wickedly playful hot jazz jam session of ideas and insights into electronically mediated human interactions. It mixes sociological accounts of the early online BBS communities with anecdotes of high-tech high jinks at the Atari Lab. It contrasts multiple-personality syndrome with participating in a MUD and uses the case of a psychiatrist cross-dressing in cyberspace to raise profound questions about the future of gender and identity. The more you delve into Sandy Stone's work, the more you understand why she calls herself a "discourse surfer." She hangs ten and shoots the curls on the monster waves of hardcore science and high-cultural theory. Best of all, she takes her readers along for the ride.

**STRYKER: You've worked in so many fields. Describe some of your early neurological work on hearing and vision.**

**STONE:** I did a series of experiments in the '60s with chronic implants – ones that stayed in place a long time. These for me are one of the most fascinating things I've ever done. I connected the electrodes implanted in a cat's inner ear to a miniature stereo FM transmitter attached to its collar. I would let the cat wander around outside in the fields, then I would go to my receiver and put on the stereo headphones and "become" the cat. Cats don't hear like humans. Their hearing response curve is completely different, and they can hear right on up into the ultrasonic range. So, of course, I wasn't really hearing what a cat hears because my hearing doesn't extend into the ultrasonic, but I wasn't hearing like a human, either. At the upper frequencies of my hearing range, everything was so clear and loud. You could hear every grass blade. You could hear every insect walking. And, of course, you could hear the field mice off in the distance in stereo. I came to understand something about feline subjectivity. That for me was the beginning of my experience with communication prosthetics.

**A transspecies experience – that's deep! It reminds me of those scenes in William Gibson's *Neuromancer* where the console cowboy is wired into Molly Million's full perceptual field.**

In many ways, the cat with the transmitter and me with the headphones was the first actualization of what Gibson called "simstim." That experience has never left me. If the Sandy/cat link were two-way, neither of us would be what we'd been before. As it was, Sandy became more cat, but the cat didn't become more Sandy.

**Isn't that something like a simple version of the Internet based on different components – genetically coded carbon molecules instead of mass-produced silicon chips?**

With the Internet, of course, we've opened far more fascinating possibilities. But the whole discussion is an extrapolation of something that already existed before either Sandycat or the Internet. Multiple-user virtual communities are only the latest technological inflections of it. People in close proximity synchronize the ways they process symbols. On the one hand, this is just a long-winded way to say "culture." On the other hand, think of the way some old married couples become so attuned to each other that they finish each other's sentences. In lifelong dyadic partnerships, when one partner dies the other rarely survives for more than a year or two. That's something far more complex and much deeper than what we normally think of as "culture."

**In the acknowledgments for your book you say you've been doing "this work" for a "relatively short time." It sounds as if you've been working in electronic communications for decades.**

That's right, but I was referring to my current work in cultural studies of science and technology. My problem with working in the film and music industries and even the computer business was that we didn't have a common language for talking about the meaning of technology. There was simply no room for that kind of discussion when I was in those industries.

**So you're making a distinction between working in high tech yourself and studying how that work is done by others, like an anthropologist fascinated with late-modern technical and scientific pursuits?**

I moved into cultural studies because I found that the discipline was big enough to hold me. I could find ways in which all of those things fit together. The critical study of the technical fields I happen to have worked in – neurology and telephony, sound recording and computer programming – is terribly important because they're the sites of some of the fiercest contests raging today. Not just contests over markets, but over meanings. Whoever determines what technologies mean will control not merely the technology market but thought itself. That's scary.

**What was some of your formative work in cultural studies like?**

It started with a piece called "Sex and Death among the Cyborgs." I set out to write an essay on data compression when a bizarre thing happened and I wound up writing about phone sex. I realized that phone sex was a practical application of data compression. Sex usually involves as many of the senses as possible – taste, touch, smell, sight, hearing. Phone-sex workers translate all those modalities of experience into sound, then boil that down into a series of highly compressed tokens. They squirt those tokens down a voice-grade line and someone at the other end just adds water, so to speak, to reconstitute the tokens into a fully detailed set of images and interactions in multiple sensory modes. "Sex and Death among the Cyborgs" was an utterly simpleminded attempt to explore boundaries and prosthetics and everything that interests me now.

**What do you mean when you say "boundaries and prosthetics"?**

Subjective boundaries and bodily boundaries. Remember the '80s pop psychology expression "bad boundaries" that referred to someone who had trouble keeping his or her thoughts and emotions separate from someone else's? They'd be very suggestible and have trouble acting on their own. That's one sense of a subjective boundary. Boundaries move around all the time. For example, where's the boundary of an individual human body? Is it skin? Is it clothes? It's different in different circumstances.

**It's like sex, which is partly about shifting your bodily boundaries around and mingling with another body.**

Right. In *Desire and Technology*, I use Stephen Hawking as an example of how body-boundary issues interact with technology. Because Hawking can't speak, he lectures with a computer-generated voice. When I speak, I sound different if you're in the room with me or if you hear me over the phone. But Hawking sounds exactly the same. The boundary between his human voice and communication technology has broken down. That's another kind of boundary.

Hawking's computerized voice generator is also a prosthesis, from the Greek word for extension. It's an extension of his person. It extends his will across the boundaries of flesh and

By Susan Stryker

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*Susan Stryker's book* Trans: Changing Sex and other Ecstatic Passages into Postmodernity *is forthcoming from Oxford University Press. She can be reached at* mulebabyxx@aol.com.

PHOTOS: CHIP SIMONS

machinery, from the medium of air molecules in motion to the medium of electromagnetic force. Marshall McLuhan pointed out that communications media are extensions too, and that they interpenetrate us in ways we'd never anticipated and change us in ways we don't realize.

**So when you talk about being interested in problems of "interface," "interaction," and "agency," you're not using these terms in their narrow computer-industry sense.**

Exactly. At the close of the mechanical age, our consciousness is deeply changed by the way we're immersed in communication technologies every waking, and perhaps sleeping, moment. We are already "transhuman." The boundaries between "us" and our prostheses – contact lenses, implants, artificial organs, serotonin reuptake controls, genetic engineering, communication networks – have become vague, and they shift continually.

**What was it like to work as sound engineer for Jimi Hendrix?**

Jimi could hear sounds in his head that required digital equipment to produce – technology that didn't exist yet. With analog machines we could only approximate what he wanted. The first time I worked with him I just sat at the board, shaking because of the power of the electronic connection. It was like holding on to electrodes, with the music flowing through me.

**Then how did you end up involved with personal computers?**

Shortly after Wozniak and Jobs started Apple, I found one of their prototype boards for the Apple II in a dumpster. I had no idea what it was. It was just this beautiful object. I put it up on my wall.

**You first got your hands on a personal computer by dumpster diving?**

Uh-huh. A few weeks later, a friend of mine who had gotten a job at Apple told me what it was. He agreed to steal some ROM so I could make it work. We scrounged up chips here and there. We found where the traces were defective and fixed them. We needed a power supply, which at this point was very proprietary.

It was difficult, but eventually I had my own computer. I began writing programs. One day I accidentally fell into the disassembler and made this kind of intuitive symbolic connection to the machine. It was so intense. The wheels began to turn. I could see the planets moving and the atoms vibrating, and I could see mind with a capital *M*. I could reach down into the very soul of this thing. I could talk to it. It was this sense of, well, here was the physical machine and here was the virtual machine, the abstract machine. It was a living creature that I could reach into and feel the circuitry. I could feel what the code was like. And I wasn't the only person who experienced this. For many people who tended to be socially inept and quite shy anyway, the quasi-intelligent character of the machine has replaced human social interaction. The interactive potential of the machine has created a novel social category of what I call *quasi guys*.

**Computer nerds, in other words.**

Or, to be less prosaic, assemblages of machinic and human qualities that act like they're human – but just enough to produce the need for closure, the need to secure one's subjective boundaries and make a distinction between human and machine. And that can never happen finally and unproblematically, precisely because of the inherent connections between human and machine. So the desire is perpetually unfulfilled.

**You treat desire as a movement across a boundary in the attempt to satisfy a need. If boundaries between humans and machines, or between species, or between the sexes, continue to shift or break down, is that the end of desire as we know it?**

That's one of the big questions of transhuman theory and the area that currently most interests me – transgender theory.

**You yourself are transgendered. Is that a form of reality hacking – you "change sex" by using for your own purposes the codes that regulate how we understand gender and the body?**

The body is an instrument for involvement with others. It's a site for the play of language, a generator of symbolic exchange. The thing that generates the language of social interaction is first and foremost the human body. Body, language, consciousness – they are aspects of the same thing.

**Themes of changing sex pop up everywhere in the media these days, especially in relation to cyberspace fantasies. Gibson has a lot of "trannie" stuff sprinkled throughout his work. Among a lot of really hip young hackers, genderfuck drag is now practically de rigueur. In the movie *Hackers*, the ultra-élite hackers who step in to save the day at the end of the film are these totally flaming queens. Why do you think high tech and transgender go together so easily?**

"There will always be gendernauts."

Because people involved with high tech are frequently more inquisitive, more open to new experiences, and right now the cutting edge of new experience is transgender. It's a momentary thing, because the high-tech folk will age and become more conservative, and high tech itself will become more mainstreamed. But transgender will always be part of human culture. There will always be gendernauts.

**I know a woman with several distinct personalities, some of which manifest only online. Where do those personalities go when this person's body isn't touching a keyboard that's plugged into the Net?**

This is one of those Where does the candle flame go when it goes out? questions. The best analogy would be quantum theory. Identities appear and they disappear. They go from virtual to real, from real to virtual, crossing back and forth over those boundaries, sometimes predictably and sometimes not. So an easily intelligible answer to the question Where is that identity when it's off the Net? is to say it becomes virtual, or potential, during that time. The presence of the prosthesis in the communication network is what makes the virtual persona become real.

**Isn't this just another way of saying that identity always emerges in interaction?**

Yes. And it's another way of saying that identity is always multiple. Virtual environments allow the terms *self* and *body* to mean differently. I see in the new virtual worlds created by communication technologies the opportunity for a legitimization of some forms of multiplicity as well as transgender identity and other kinds of subjectivity that are stigmatized in the "real" world. ■ ■ ■

*Sandy Stone's homepage is at* www.actlab.utexas.edu/~sandy.

HUCOMM
in co
"The thing that generates the language of social interaction is first and foremost the human body.
Body, language, consciousness –
they are aspects of the same thing."

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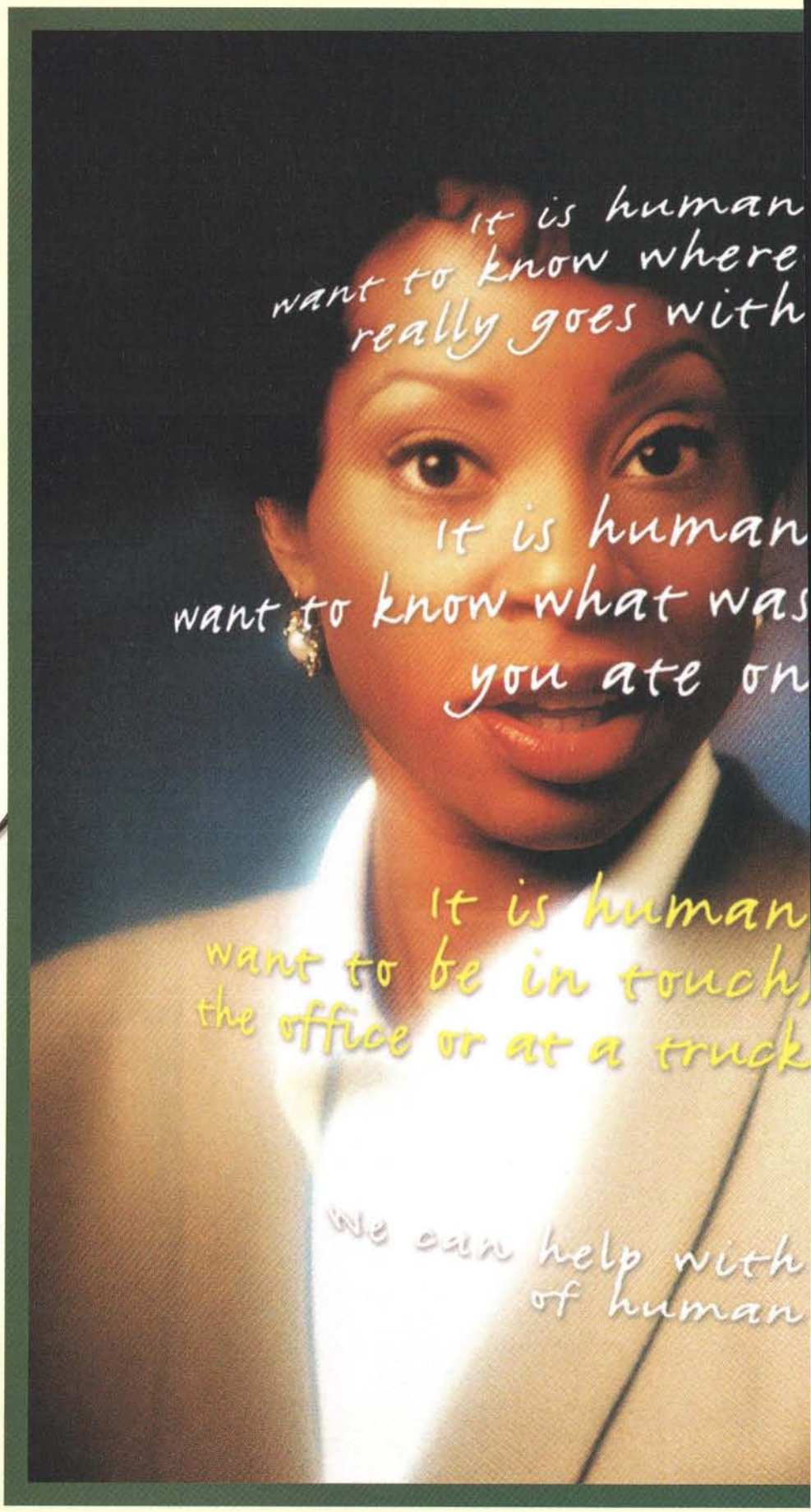


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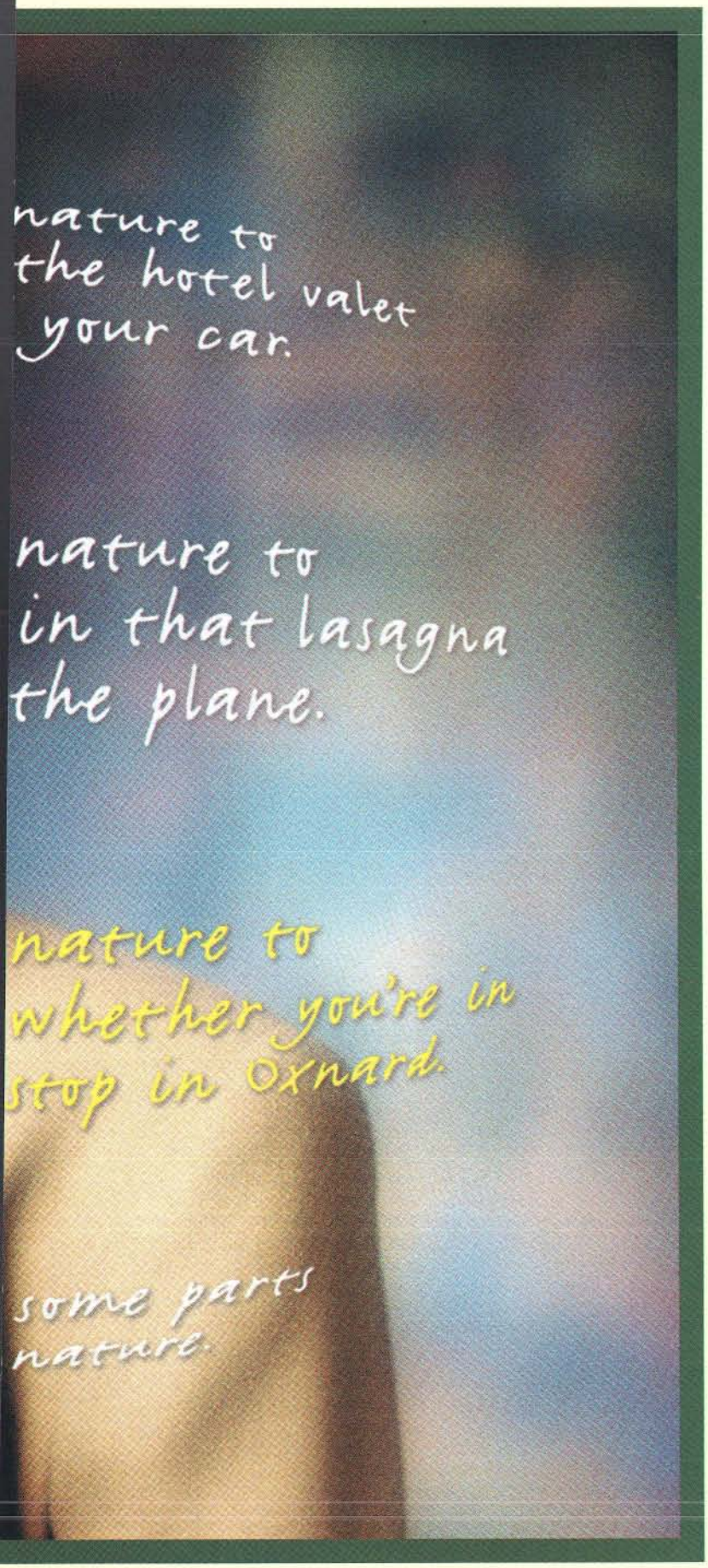


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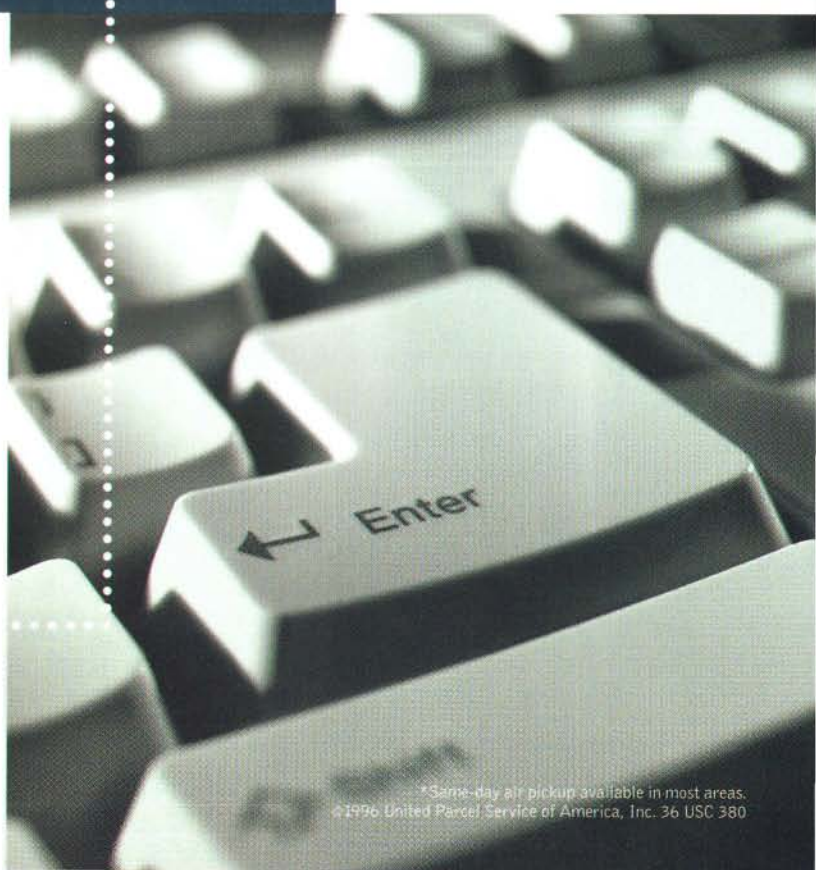


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## Email Snaps

I first sent my film to Seattle FilmWorks last year because it could return my pictures as prints, slides, or on disk. Now, it has gone one better. With PhotoMail, I get shots back via email. It's simple: register at the Web address, then request PhotoMail delivery with your processing order. FilmWorks lets you know electronically when your pics are available at its Web site.

Photos come compressed, but you can read them with PhotoWorks freeware for Windows or Mac. If you get your shots on floppies, you don't need PhotoWorks to view them – but the software does

**Picture this.**

let you crop, rotate, flip, mirror, posterize, change colors, and adjust brightness, contrast, and gamma. I wish it let me edit parts of the photo instead of making global changes, but you can export photos into many formats. PhotoWorks lets you undo changes, for which I'm often grateful. Maximum resolution of the images is 640 by 480, but they look better than standard VGA thanks to their 24-bit color depth (16 million colors). Each frame takes up 15 to 70 kilobytes.– *Ivan Berger*

Email or disk photos: US$13.90 for 24 exposures. Seattle FilmWorks: +1 (206) 283 9074, on the Web at *www.filmworks.com/*.

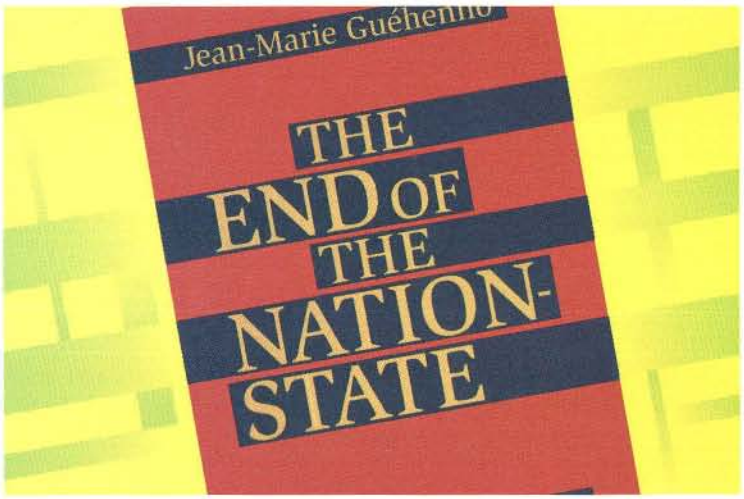
## Empire without Emperor

The wired world – interconnected, fluid, time-compressed, virtual – can be a miserable dystopia where we live in isolated cells breathing air so filtered and purified we can no longer survive outside, as in E. M. Forster's "The Machine Stops." Or it can be a utopia in which we communicate online, creating bonds to better humankind.

Jean-Marie Guéhenno, author of *The End of the Nation-State,* describes emerging forms of social organization and suggests some unsettling, and thrilling, possibilities.

Guéhenno is a political scientist and former French ambassador to the European Union. The metaphor that permeates this book is the network, a woven, flattened tapestry without center. Memes move around this complex form and make control impossible. "It is a question," he says, "of conveying information in all directions and, in so doing, to exist like a huge cybernetic machine." Information infrastructure supports this world because it is the emerging self-organizing shape of the global culture, and no one will rule.

Nations will disappear (global business has rendered them obsolete). What he calls a new empire – similar to that of Rome, but without an emperor – is emerging. In a world where power, influence, and




**National boundaries give way to a decentralized cybernetic machine.**

information are networked through alliances, friendships, business relationships, and common interests across national boundaries, there can be no hierarchy and no center. He draws an explicit parallel to the Internet with its flexibility and resistance to nuclear attack. In the new social net, he says, "the circuits, the networks, recompose themselves around the affected zone in an almost biological fashion."

It's happening all around us. Big business is already giving way to a complex of many businesses, large and small, interacting with many customers and suppliers in alliances, partnerships, special-interest groups, cultural and linguistic identities, market segments, and even, sometimes, geographic areas. "Power no longer consists of knowledge," Guéhenno says, "but in functioning as a link between bodies of knowledge."

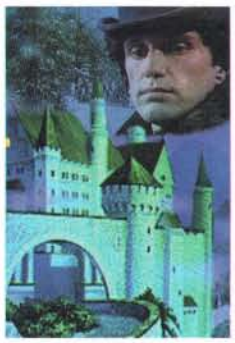
The network is infinitely reinterpretable. Its birth occurs without blood (well, not much, anyway). National borders disappear in a swirl of fractal global relationships. "In a system that is no longer governed by a pyramidal and centralized hierarchy, one can certainly hope that no breakdown, no sabotage is decisive." One can hope, indeed.
– *Rob Swigart*

*The End of the Nation-State,* by Jean-Marie Guéhenno, translated by Victoria Elliott: US$19.95. University of Minnesota Press: +1 (612) 627 1970.

## Shining Knight

The interactive movie has inspired a strange phenomenon: videogame designers are becoming film producers and vice versa. More often than not, this creates a worst-of-both-worlds scenario: bad games sporadically interrupted by bad movies. But new hope shines on *The Beast Within*.

The game follows Gabriel Knight, a carrot-topped Cajun "shadow hunter" investigating an outbreak of werewolf-related killings in Munich. Our hero uncovers a mystery concerning King Ludwig II, an enigmatic figure known as Black Wolf, and a lost Wagner opera with a lycanthropic theme.



**Bad moon on the rise.**

The enthralling story is propelled by full-motion videoclips that, though occasionally melodramatic, feature surprisingly good acting. The mature-themes rating – usually no more than a red flag for scantily clad babes and swearing – is valid here, given the game's homoerotic subtext and occult philosophy.

Designer Jane Jensen proves the interactive movie may yet hold some life.
*– Ron Dulin*

*The Beast Within*: US$64.95. Sierra On-Line Inc.: (800) 757 7707, fax +1 (206) 642 7617, on the Web at *www.sierra.com/*.

## Mod Design

In the forward-thinking realm of digital culture, few anticipate the day when shimmering CD-ROMs will be shelved alongside unplayable 8-tracks in thrift stores. Fewer still ponder the fate of those poor Mac Pluses, NeXT boxes, and slow modems. These objects once marked a pinnacle of technological innovation but now reside in a junk heap of beige plastic.

*Designing Modernity: The Arts of Reform and Persuasion 1885–1945* is a stately exhibition that rescues definitive objects of futures past. With a careful selection of vintage painting, sculpture, furniture, housewares, and commercial art, the show traces international design history in the modern age. It reveals the considerable role designers have played in easing future shock and selling political thought.

Though the exhibit's chronology ends with World War II, the show reveals the timeless, seductive quality of effective design. The objects reflect the evolution of tech design over the last 100 years. The droopy, natural look of late 19th-century art nouveau, for example, was a cosmetic resistance to the mark of the machine. Early telecommunications systems and radios were disguised in Gothic casings.

**Bauhaus and beyond: a transplendant arch of information design.**

A section celebrating America's love affair with modernization points to how change was finessed with ever-futuristic tie-in souvenirs: gleaming sci-fi radios, skyscraper-shaped bookcases, and sleek chrome miniatures of the 1939 World's Fair Trylon and Perisphere. The works of futurists, the more politicized Italian counterpoint to America's love of the future, carry this visual theme into blatant propaganda. Though futurists believed in the "renewal of human sensibility brought about by great discoveries of science," the idea has inherent ties to industry- and government-controlled images. With the infamous three-dimensional *Continuous Portrait of Mussolini* and striking fascist political posters from Italy and Germany, the show issues a dazzling, still pertinent warning: Design can be dangerous.

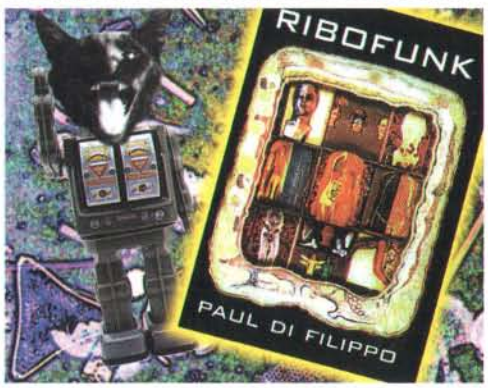
Surveying the graceful Bauhaus appliances, I couldn't help but think of multimedia PCs. Like those computers, the Bauhaus objects blur the distinction between work and pleasure. Sound familiar?
*– Glen Helfand*

*Designing Modernity: The Arts of Reform and Persuasion 1885-1945* is on view at the Los Angeles County Museum of Art this summer and travels internationally through 1999.

## Ribofunk Manifesto

**A few years ago, Paul Di Filippo coined the word *ribofunk* and wrote a "Ribofunk Manifesto" advocating a new kind of science fiction that might do for biology what cyberpunk has done for computer science. Most other SF writers thought he was kidding. He wasn't.**

***Ribofunk* is truly great sci-fi: wildly inventive, warmly human, culturally relevant, and deeply funny. The book is a series of short stories linked in theme and language. Ah, the language. Di Filippo does dazzling tricks with English: he coins words and phrases like *trump* for good, *konky* for bizarre, *non-slouch* for excellent, and *Heavy Wonderful* for a kind of drug. He invents marvelous technological riffs on such classic sci-fi themes as body modification (antler inserts for your head), nanotechnology (trees that grow woven fabric), and robotics (a plug-in computer consciousness that looks like a silver hockey puck). A sample graph from his short "After-**




Di Filippo experiences a fractal exfoliation.

**school Special" reveals his talent: "The class was taking a break from invirting with CADaver, the human-anatomy virtuality used mainly to train feldshers. We were all lounging around in the spleen, wearing our secondary identities. The school had a contract with MicroDisney, so we were forced to wear their patented images. Everyone hated it, but the trope-dosers claimed it was for our own good."**

**Di Filippo puts together the wonderful language and the wild science in brilliantly funny scenes, which click together into amazing stories, which inform and illuminate each other; and this whole fractal exfoliation leads to the utterly wonderful *Ribofunk*. This is *the* sci-fi book of the year, even if it is from a small press. If you can't find it in your bookstore, order it direct from the publisher.**
**– *Rudy Rucker***

*Ribofunk*, by Paul Di Filippo: US$20. Four Walls Eight Windows press: (800) 626 4848.

CHAIR: GIO PONTI, CLOCK: K. WEBER, SCALE: JOSEPH SINEL, PHOTOGRAPHED BY BRUCE WHITE

## Maxx Head Room

No TV network is as adult-animation-savvy as MTV. In the early '90s, its *Beavis & Butt-head* and *Liquid Television* series helped renew interest in animation as an art form.

These days, MTV's reviving the art of the 1920s-type serial with two animated series, *The Head Saves the Earth* and *The Maxx*. After a brief tour of duty on the network, these gems are resurfacing on video, sans commercials and with better sound and picture quality.

*The Head Saves the Earth* will have you hoping its hero Jim carries insurance to cover the alien in his brain and any other damage that may come in a second-wave UFO invasion. Crudely drawn à la *Beavis & Butt-head, The*

**Beavis and *who?***

*Head*'s irreverent humor is downright wicked.

Jim wouldn't survive five minutes in the world of *The Maxx*. Based on the comic book by Sam Keith, *The Maxx* blends computer animation, fantasy-style drawings, classic comic inkings, and Disney-esque animation in a rich, layered narrative about a homeless man who thinks he's a superhero. Disturbing and deeply symbolic, *The Maxx* is too rich and too complex to absorb in one viewing. Yet it also holds the distinction of being MTV's best animated tale. And that, animation buffs will agree, is a tall order indeed. – *Paul Semel*

*The Head Saves the Earth* and *The Maxx: The Original Series:* US$14.98 each. Sony Music Video, +1 (212) 833 8000.

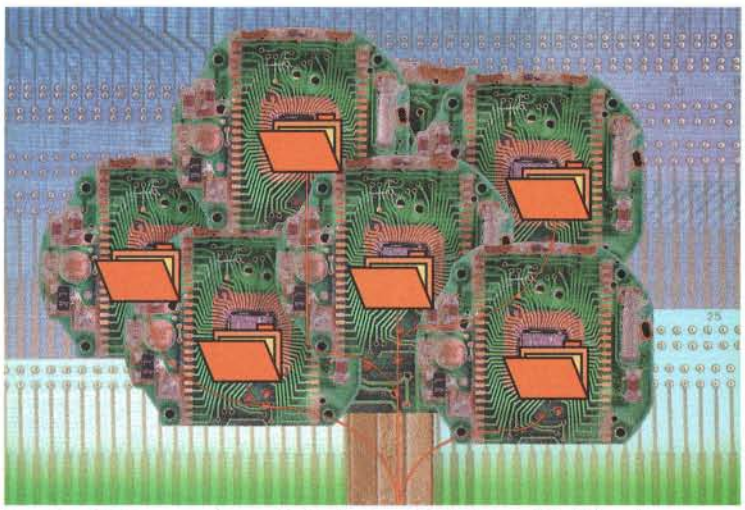
## Webchat

At last there's hope that Web conferencing can bring conviviality to a universe of billboards, marketplaces, and manifestos. In late 1994, the first generation of Web conferencing software, on *Pathfinder* and *HotWired*, proved that it was possible to engineer group conversations on the Web. It also showed that Web servers, bandwidth, and sophistication of the user interface had a long way to go.

In early 1996, a new generation of Web conferencing software emerged. So far, two packages stand out.

I've been using Motet for several months to participate in discussions on Café Utne and The Gate. Motet is extremely fast, at least with a small message base, and it has a conference and topic list structure that makes it easy for online habitués. HTML is deliberately not allowed in messages, except for URLs, so conversations don't get clogged up with huge inline GIFs.

I've also been experimenting with Web Crossing in a private conference with a group of college students. Web Crossing has a different interface, which displays a "tree" of embedded topics and conversations instead of a linear format at the top of every page. This makes it easier to move around the entire web of conversations, and to know where you are. But overall I'm not in love with branching. It diffuses conversations into small subgroups and doesn't foster a larger sense of community discussion.



**Branch out into new spheres of Web-being with Motet and Web Crossing.**

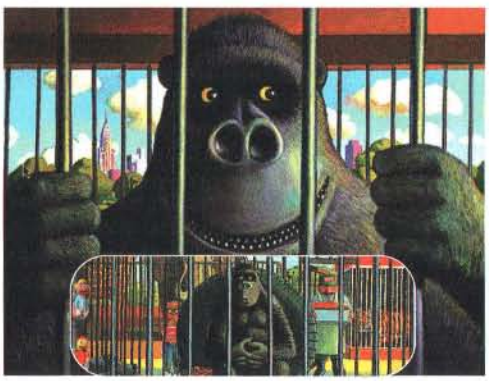
Both Motet and Web Crossing do the job. For the first time, it's possible to sustain a group conversation, using links and inline graphics, without waiting forever for pages to serve. The Web lowers the barriers to multimedia publishing worldwide, giving individuals and small organizations global reach. But email and Usenet are still the social life of the Net. Motet and Web Crossing are promising signs for a greater Web future. – *Howard Rheingold*

Motet: go to *www.utne.com/* and register for Café Utne. Web Crossing: *www.lundeen.com/*.

## Play It, Daddy-O!

**My 3-year-old son, Gavin, learned about computer interactivity by passive participation in action-packed games like *Marathon* and *Doom*. Potential psychological effects aside, his taste in CD-ROM entertainment stretches far beyond his years. When he hits a key or clicks the mouse, he expects something exciting to happen. Flimsy electronic storybooks won't satisfy this boy.**

**To pass the Gavin Test, a CD-ROM must have big machines or cool animals. It must contain more than a cute narration and characters that jump around when you click on them. *The Escape of Marvin the Ape,* based on a book by Caralyn and Mark Buehner, fits his bill. It follows a big, cool primate on an expedition from the zoo to New York City. Gavin gets music, a matching game, and painting segments to boot. Three worms, each with their own quirks, guide you through the narrative and, when selected, add a quirky dimension to the story experience. Albert is a wacky scientist. Wendy is a straitlaced assistant. Pablo is a groovy beatnik artist. Your child may favor one worm, but the presence of all three enhances the software's replay value considerably.**



Go ape over Marvin, the Big Apple escape artist.

**The interactive spots are fairly inventive, if a little sparse, and the artwork is vastly superior to the flood of dreck coming out these days for kids. *Marvin* follows the big guy as he wanders through the Big Apple. After his breakout, he visits attractions such as Central Park, the public transportation system, and an art gallery. Finding Marvin in each scene is a blast for kids and, when you click on him, you get his take on things in thought balloons. Kids' CDs are getting better all the time, and *Marvin's* right up there with the best. Take Gavin's advice (after clicking on Pablo the beatnik one too many times) and "play it, Daddy-o."**
**– *Scott and Gavin Taves***

*The Escape of Marvin the Ape CD-ROM* for Mac and PC: US$29.95. Penguin USA: (800) 253 6476, fax +1 (201) 385 6521, email *electronic@penguin.com*, on the Web at *www.penguin.com/usa/*.

## Strong Box

Why did I clear the snow from my drive and load my least favorite CD *(Bass Cows from Hell!)* into my most expensive CD case?

Simple: Allsop's StrongBox jewel boxes are supposed to be well-nigh indestructible. I planned to test that claim.

Dropping the box onto a concrete floor a few times caused the case to fly apart – but it didn't crack or break. Stomping on the box (I really should lose weight!) produced an ominous crunching sound, but no damage. Finally I drove my car back and forth over the sucker in

**Nigh indestructible.**

the driveway. This scuffed the surface, but the marks washed off easily.

Although the StrongBox lives up to its name, there are nitpicks: thin album booklets slide out of the lid more easily than out of standard jewel boxes; the plastic has a slightly smoky tint; and, finally, it costs about 50 percent more than the usual plastic case. But that shortcoming disappears if it saves one of your favorite CDs from accidental destruction.
– *Ivan Berger*

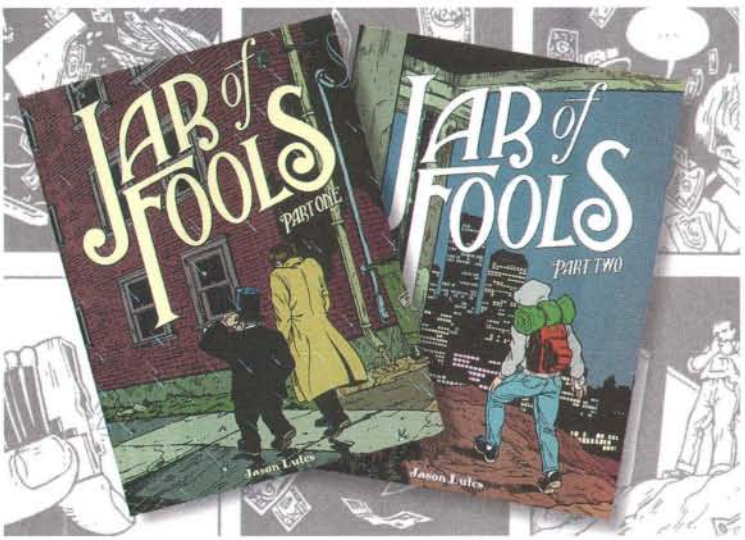
StrongBox: US$2.99 each. Allsop Inc: (800) 426 4303, +1 (360) 734 9090.

## Magic's Last Gasp

The wonder of a small-time magician, the lingering heartbreak of separation, and the misery of emotional isolation are not your usual subject matter for a comic book. Yet Jason Lutes's hauntingly spare *Jar of Fools* takes on all that and more in a tale of lives unhinged.

Set in a fictionalized Seattle, this two-part graphic novel traces the downward spiral of young magician Ernie "Ernesto" Weiss. Behind on his rent and plagued alternately by visions of his brother's suicide and by the bittersweet remembrance of life with his old girlfriend, he is adrift on a sea of rain and regret. Woven into the tale are Al Flosso, a refugee from a seniors home who has his own mental-health woes, and a small-time con man by the name of Nathan Lender, who seeks a better life for his motherless daughter, Claire.

These characters' lives unravel in a slow-motion pictogram of depth and sincerity as they both help and hurt each other in ways far more real than on, say, MTV's *The Real World*. Magical spells, the kind that Harry Houdini used to practice, sit along the borders and




**Emotionally isolated lives adrift in a Seattle sea of rain and regret.**

panels of the story quietly giving the reader some slim hope that redemptive powers may yet make everything all right.

Intermingled dream sequences and hallucinatory images not only convey Ernie's shaky grasp of reality, as he struggles through the daily miseries of his life, but other characters' fractured emotional states as well. Much as a film editor employs visual tricks, Lutes allows dreams to flow into real time with nary a twitch in style as he turns the tale into an otherworldly storyspace.

The story itself is so masterfully told that it could stand alone as a novella in *Harper's*. When combined with Lutes's spare black-and-white line drawings and creative use of the comic book medium, it becomes something transcendent – a piece of literature that speaks to the emotional core. First serialized in Seattle and Providence, Rhode Island, *Jar of Fools* is now available at comic book stores everywhere.
– *Todd Krieger*

*Jar of Fools*, by Jason Lutes: US$6.95 each for Part One and Two. Black Eye Productions: +1 (514) 274 8375, email *mail@blackeye.com*.

## Newsflash

**I am the consummate news junkie. Give me an office with CNN blaring, NPR going nonstop, a pile of current affairs magazines to inhale, and raw, unprocessed information coming at me from the Net anytime. Happiness is a good news day.**

**When I came across infoMarket News Ticker on IBM's Web site, I knew I'd found an app that would get a special place on my Start menu. Installation was a breeze. Within a few minutes, I had a stream of live headlines scrolling across the News Ticker bar on the top of my screen. Reuters and ESPN are the first news services offered. I chose the headline categories I wanted to view, opting for breaking news, entertainment, business, international developments – basically everything but sports.**

**Now, as I work my way through daily projects, I watch the rest of the world's events scroll by. When a headline catches my eye, a click of the mouse**

A news junkie's ultimate fix.

**fetches the article using my browser. I've set my Ticker to update headlines every 10 minutes – especially handy when I'm following a particular story. During the vote for the Communications Decency Act, I clung to the Ticker for dear life as I frantically worked on other projects. If I'm feeling impatient, I can click for an update anytime I wish.**

**So what's *not* to love about such a clever program? For now, Macs are out of the picture. You need Netscape, NCSA Mosaic, or MS Internet Explorer to view full articles. I can live with that, but I wish IBM would ditch the ads that take up a full third of the news bar and change every 20 seconds or so – incredibly annoying. But we news junkies need our fix. What's a little commercial intrusion to the information obsessed? – *Elizabeth Lewis***

infoMarket News Ticker: free shareware (but will go commercial sometime in 1996). Available at *www.infomkt.ibm.com/ht3/ticker.html*.

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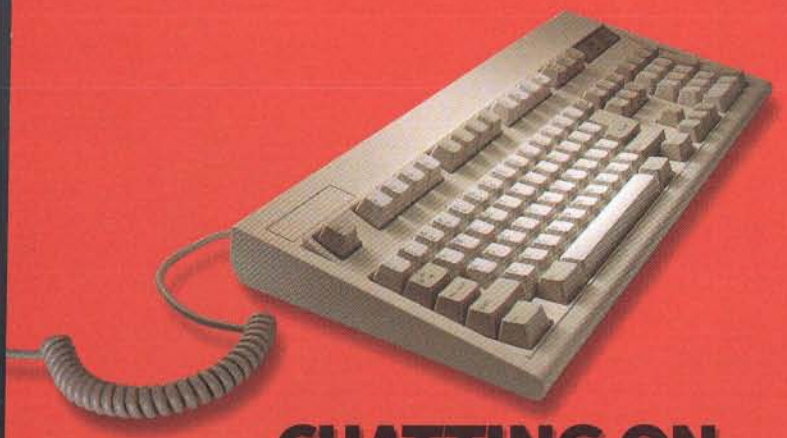

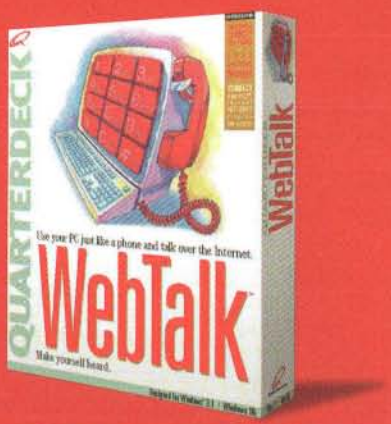


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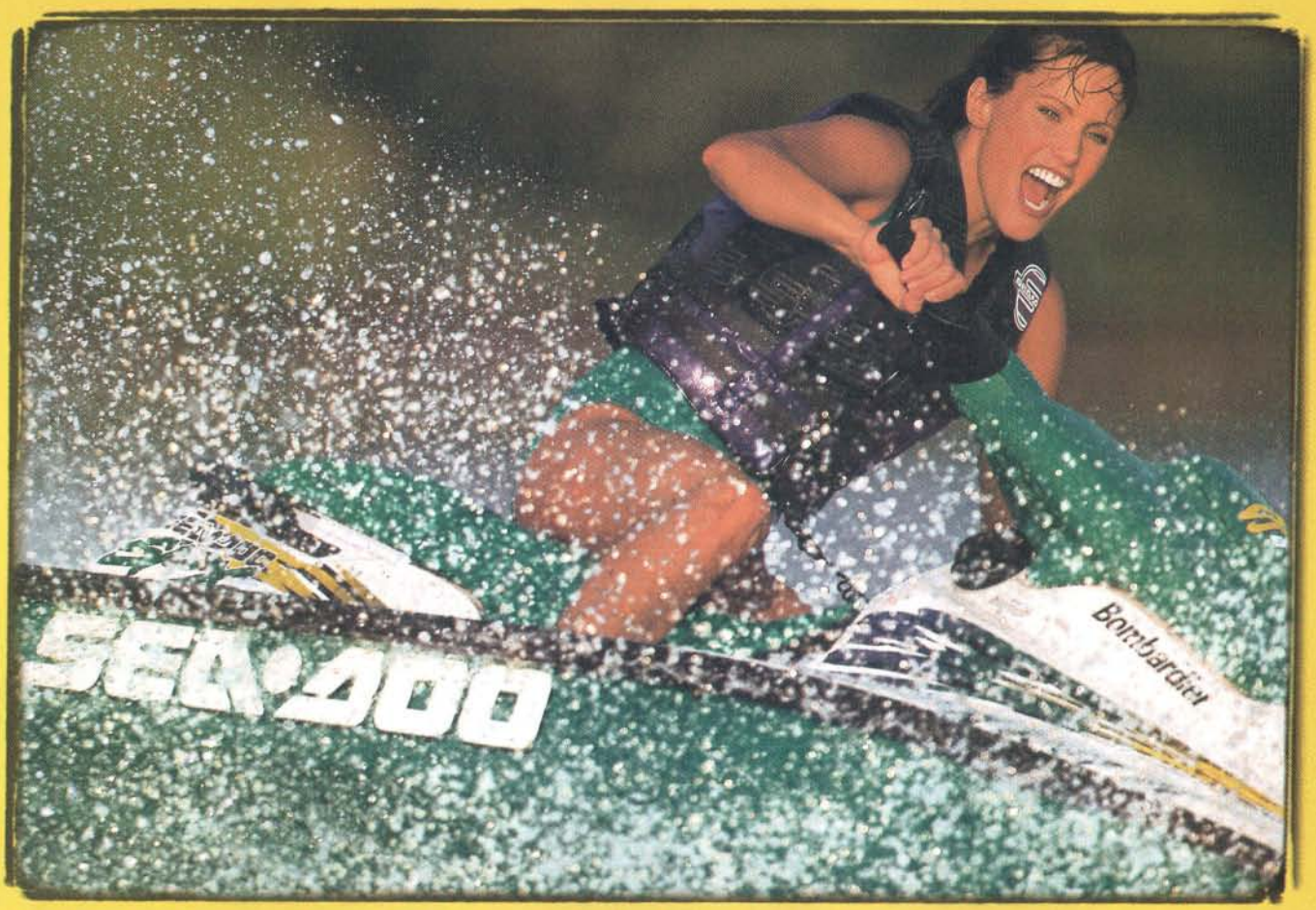


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## CYBERVALLEY PTA

In the eyes of many, CompuServe's biggest problem is its interface. Or rather, its lack of interface. But, instead of re-engineering the information service, the company has decided to focus its efforts on creating Wow!, a new home-oriented online service.

It seems that in CompuServe's eyes the "content is king" colloquialism is little more than an oppressive capitalist scheme designed to placate the masses in a confusing sea of information and technobabble. Wow! was designed, says a press release, from the "ground up" (driven by consumer desires) rather than the "top down" (driven by content and technical forces) to meet the needs of the "next generation" of online users. None of this anti-technobabble will make much sense to anyone who grew up around the Commodore 64 and – saints preserve us! – BBSes and telnet apps.

Wow! was made to serve consumer-lifestyle needs – which means a focused (read: limited) pool of content, arranged so that users are only a few clicks away from an answer. The adult space – accessible with a PIN – includes email, chat, shopping, and Internet access, and (it is a family service, after all) parent control software for corralling the kiddies' prurient interests. The kids' space is tailored to younger minds and is moderated by an online advisory board.

Besides the fact that Wow! allows for word-based email handles (a quantum leap into the early '70s), the most interesting feature of the service probably comes from current CompuServe users' GUI complaints. Wow! lets users customize their own interfaces and the content that goes along with them: what you see is different from what your spouse, kids, and neighbors see.

In light of the Communications Decency Act, CompuServe's Wow! seems a pragmatic move toward a wholesome, family-oriented cyberville. It also flies in the face of everything great and liberating about the Net. Which begs the question: Are one's interests truly served in dumbing down the experience? – *Tim Barkow*

*Wow!: US$17.95 per month. CompuServe: (800) 943 8969.*

**Release: April** On the heels of VDOlive's video streaming product (*Wired* 4.04, page 36), InterVU Inc. is releasing Pre-VU, a freely available Netscape plug-in for streaming MPEG video through your Web page. Now, everybody's got the power – but who's got the bandwidth? *InterVU Inc.*: www.intervu.com.

**Release: Late April** Get off your lazy ... Cory's got a CD-ROM for you! *Cory Everson: Body, Mind, and Soul* is gonna teach you how to get ahead through proper nutrition and total physical and mental fitness. The planned Web site companion will keep you ahead of the Joneses with the latest health information. This is one-stop body maintenance for the cybersavvy. *Philips Media Software: (800) 883 3767.*

**Release: April/May** DTP for the Web? Future-Tense Texture is a Java-based Web authoring system that allows for full control over fonts, graphics, and interactivity. Texture's free viewer applet is dynamically downloaded and allows for inline viewing in Navigator 2.0. When combined with the Custom Module, Texture will customize documents for individual users – and you never have to write a line of Java. *Texture authoring tool: US$495. FutureTense Inc.: +1 (508) 263 5480*, www.futuretense.com/.

## JUST OUTTA BETA

**Release: April/May** Riker's been directing a CD-ROM, of all things. *Star Trek Klingon* promises a journey into the culture, lore, and ritual of those bump-headed bruisers from across the tracks. And watch out for *The Next Generation* and *Deep Space Nine* episode guides on CD-ROM. *Simon & Schuster Interactive: (800) 223 2336.*

**Release: May** Everything you know about Jean-Paul Sartre is wrong. *Hope Now: The 1980 Interviews*, a book full of conversations with Sartre's assistant Benny Lévy, conducted shortly before his death, reveals a philosopher who had abandoned leftism and his friends for messianic Judaism. *University of Chicago Press: (800) 621 2736.*

**Release: May** *Disney's Animated Story-Book, Toy Story* includes 15 story screens with clickables and four games. The CD-ROM was developed by Pixar Animation Studios. And if this isn't enough, wait for the October *Toy Story* video release, complete with a US$100 million marketing push. *Disney Interactive: (800) 900 9234.*

**Release: Horizon** Launching vehicles into space using laser power seems like a dream until enough money makes it a reality. If the powers so deem, a ground-based laser launch system could be built within five years – the technology is out there. Check out *www-phys.llnl.gov/clementine/ATP/Laser.html*.

## Various Artists

*Unsettled Scores*
Cuneiform
**Access Code 1267**

**Here is a "concept" album if ever there was one. While most compilations follow a narrative thread, *Unsettled Scores* is label-based: artists on the Cuneiform roster – who typically play progressive, minimalist, ambient, and other experimental, often fascinating new music – cover the music of their Cuneiform peers. Although the idea was proposed for the label's 10th anniversary, the celebration came and went before the project was completed. The idea remained, however, and the resultant two-disc set is a fun and intriguing killer.**

**The potent music and style of the visionary Belgian group Univers Zero has been appropriated in several tracks. With its irregular rhythms, raucously dissonant harmonies, and angular but devastating melodies, UZ sounds like a collision between King Crimson and Béla Bartók. Miriodor's medley of UZ tracks is jazzier and more brilliantly orchestrated than the originals, yet it retains a marvelous sense of weirdness and angst.**

**Virgil Moorefield churns out a drunken, careening, avant-big-band version of Henry Kaiser's whacked-out solo guitar improvisation, "Get Moose and Squirrel." Forrest Fang's colorful, atmospheric, environmental-soundscape-like "Scene of the Madmen" is a mere hint of the more structured and austere original by Piero Milesi. Hugh Hopper (ex-Soft Machine), Present COD Performance (a Univers Zero off-shoot), and Volapuk each covers pieces by Doctor Nerve. All covers are radically transformed by virtue of instrumentation: computer generated sounds by Hopper, two guitars in Present, and Volapuk's bass clarinet, cello, percussion, and "machines." C. W. Vrtacek, who came up with the concept behind *Unsettled Scores*, transforms Cartwright's "Dyed," an almost straight-ahead jazz number, into a gorgeous, lyrical, Satie-esque ditty.**

**And this is just a taste of the music in store for the adventurous listener. Many of the names may not be familiar, but there's plenty of incredible music herein. – *Dean Suzuki***

## Virgil Thomson

*Four Saints in Three Acts*
RCA Victor
**Access Code 1268**

This inspired collaboration between composer Virgil Thomson and writer Gertrude Stein dazzled audiences half a century ago and will again today. Various Spanish saints, given voice by African Americans, augment Thomson's classical blending of folk music. The result is devout music with a pervasive strain of subtextual, childlike humor. A complete digital recording of the opera is available on a two-disc set from Nonesuch, but this clever abridgment of the opera, remastered from a 1947 recording, communicates better nonsensical ecstasy.
– *Norman Weinstein*

## Curlew

*Paradise*
Cuneiform
**Access Code 1269**

Avant-garde barn burners who carbon-date back to the heyday of New York's 1980s Lower East Side, Curlew embodies a true Yankee hybrid of Mississippi mud and downtown Pavement. Led by saxophonist George Cartwright – a blues honker and a bar walker at heart – Curlew's new twin-guitar lineup sports a chewy, sinewy sound: Chris Cochrane's brillant Morse-code scrawls are the perfect foil for Davey Williams's spacey hoedowns, while the rubber rhythm section of Samm Bennett and Ann Rupel provide an R&B slap and tickle. For those who dig skronk with their stax.
– *Andrew Jones*

## Lush

*Lovelife*
4AD
**Access Code 1270**

With *Lovelife*, Lush's transition from literary mods to outspoken rockers is complete. Singer Miki Berenyi's increasing dissatisfaction with relationships can be gleaned from the song titles alone, revealing feminist sensibilities only hinted at on earlier works. *Lovelife* features ethereal melodies and vocal layering that established Lush as the preeminent dream-pop band with 1990's *Gala*, but the recording's seething anger exemplifies musicians who have outgrown their art-school digs and acquired a disillusioned savvy that is all too appealing.
– *Andrew Lenz*

## John McLaughlin

*The Promise*
Verve Records
**Access Code 1271**

From his early days with Miles Davis and his own groundbreaking Mahavishnu Orchestra, John McLaughlin has offered an eclectic mix of multicultural stimuli delivered with awesome chops. On *The Promise*, the legendary guitarist offers 73 minutes of what may be considered his autobiography, presenting a taste of his every musical whim from past to present. One cut of screaming R&R yields to a cut of funked-up R&B; a smooth acoustic jaunt moves to notey straight-ahead jazz to indigo blues. In every chapter, McLaughlin tells it all so well.
– *James Rozzi*

## Tempest

*Turn of the Wheel*
Magna Carta
**Access Code 1272**

Take an American band playing muscular Celtic folk-rock, add some twitches of early Jethro Tull (with a dose of Keith Emerson for old-fart cred), and you have … well, something oddly tasty that shows just how fine a line divides progressive music and electric folk. *Turn of the Wheel* boasts plenty of good old traditional arrangements, some originals that snugly fit the same mold, and enough jigs and reels to ensure that you get your daily aerobic quotient. More fun than you can shake a hurling stick at.
– *Chris Nickson*

## Velocity Girl

*Gilded Stars and Zealous Hearts*
Sub Pop
**Access Code 1273**

This album is amazing almost as much for its consistency as its music. Velocity Girl's combination of intricate guitar lines, pretty vocal harmonies, and up-tempo beats is a perfect, alternative, guitar-pop overdose. Just about every song on this album grabs your attention with an instrumental or vocal hook, making you wonder if the band can keep it up. Velocity Girl can, and does – all without lapsing into repetition and formula. Ever hum an entire album? *Gilded Stars* might incite you to try.
– *Peter Herb*

## Bomb the Bass

*Clear*
Quango/Island
**Access Code 1274**

Tim Simenon (aka Bomb the Bass) is the renegade sci-fi B-boy who kick started UK DIY dance music with the single "Beat Dis" in 1988. Since then, through commercial ups and downs, he's refined his vision into a potent collage of pop, house, dub, hip hop, and even ambient. On *Clear*, guest vocalists as disparate as Sinéad O'Connor and rapper Justin Warfield lay their distinct styles over Simenon's constantly mutating sound track. This is perfect pop music for the hardcore free thinker.
– *Scott Taves*

## Lluís del Milà

*Fantasies, Pavanes, & Gallardes*
Jordi Savall;
Andrew Lawrence-King
Astree
**Access Code 1275**

Jordi Savall, following a practice common in 16th-century Spain, has taken music originally composed for *vihuela* (an early form of guitar) and adapted it for a consort of viols and harp. Stately dances alternate with solemn fantasias in Mila's highly expressive music. The seldom recorded but beautiful Renaissance harp played with great effect by Lawrence-King features prominently on this disc. Another in a long series of triumphs for Savall.
– *Bryan Higgins*

## Microwave o' the Month

IMAGE: LISA SEAMAN

**Great White**
*Stage*
Zoo Entertainment
Jammed on the expressway beside a beefy TransAm, you discover your A/C is broken. Hope you like 76 minutes of *live* Great White! Hel-lo-o-o summer! – *Colin Berry*

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| Enter access code (under the name of the artist) | 3-Fast forward<br>4-Louder<br>5-Softer<br>*-Exit music/bypass most prompts |

**A charge of 95 cents per minute will appear on your phone bill. An average call is about 2.5 minutes. Music Access samples for reviews in this issue are active April 7, 1996 through July 1, 1996.**

**At the beginning of each music review, you'll find a four-digit code for each album. To hear sample cuts, dial the 900 number above, entering this code when prompted. You'll hear up to three minutes of music, at 95 cents per minute. To fast forward, punch 3; for louder volume, 4; softer, 5. To use Music Access, you must be 18, have a touch-tone phone, and dial from the US.**

| Code | Artist and Title |
|---|---|
| 1267 | Various Artists, *Unsettled Scores* |
| 1268 | Virgil Thomson, *Four Saints in Three Acts* |
| 1269 | Curlew, *Paradise* |
| 1270 | Lush, *Lovelife* |
| 1271 | John McLaughlin, *The Promise* |
| 1272 | Tempest, *Turn of the Wheel* |
| 1273 | Velocity Girl, *Gilded Stars and Zealous Hearts* |
| 1274 | Bomb the Bass, *Clear* |
| 1275 | Lluís del Milà, *Fantasies, Pavanes, & Gallardes* |


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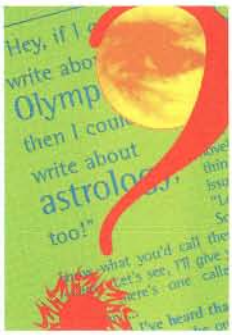
## Making the Inane Ultra-Suave

As the publisher of an electronic magazine, I'm always on the lookout for similar pubs with a good sense of humor. I hit the jackpot when I stumbled upon *Ultra-Suave*, a guide on how to live life smoothly.

"To learn to revel in inane acts is the secret to being suave," writes editor Matthew Chiavelli in the introduction. "Being suave is not an instinctual action but a carefully honed skill."

If the guiding principles aren't enough to ignite your smoking jacket, the elegant grayscale design gets the




**Like scotch 'n' soda.**

message across like scotch and soda. Just when I thought *Ultra-Suave* couldn't get any campier, I found an hysterical interview with Harvey Sid Fisher – actor, model, and singer of "Astrology Songs." Lots of zines prop up cult celebs, but this one really knows how to make the most of them.

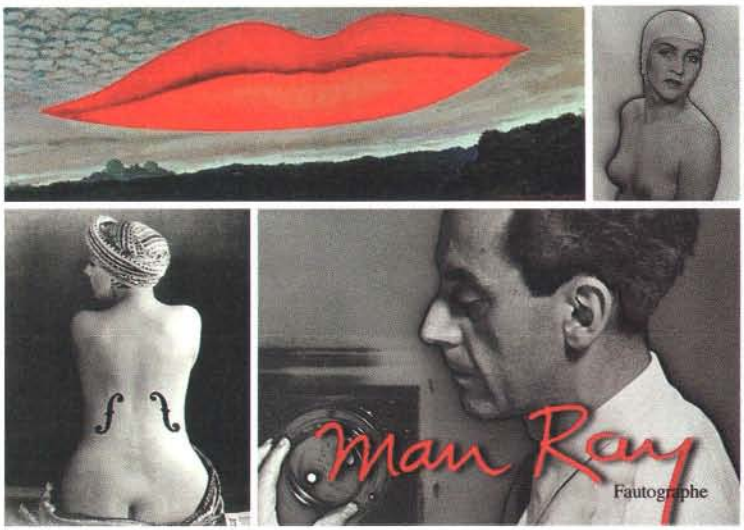
After reading *Ultra-Suave*: you can't help but take things less seriously. In fact, I'm suddenly feeling an urge to buy a seersucker suit. – *Dan Sicko*

*Ultra-Suave*: free on the Web. Capsule Design: +1 (203) 775 4317, or on the Web at *w3.nai.net/~capsule/*.

## Papa Dada's Disc

Dadaism was an art movement predicated on shock – a reaction to the civilized horrors of the First World War and an explosive new approach to the irrational side of human nature. At the center of the movement was Emmanuel Rudnitsky (1890–1976), better known as Man Ray, a Russian-born Philadelphian who hoped to invent a machine that could photograph his dreams. When I first saw Man Ray's photographs in the Philadelphia Museum of Art as a teenager, I realized for the first time that photography could induce radically altered states of consciousness. His images of superimposed nudes printed in stark black-and-white reversal were an intimation that the camera could be a portal to what e. e. cummings called "A hell of a good universe next door."

*Man Ray Fautographe* is a CD-ROM that brings much of the visionary artist's oeuvre into sharp focus. The disc includes more than 600 images of the artist's work in film, painting, sculpture, book art, and photography. A narrated slide show offers an overview of the artist's career, explaining his use of experimental techniques such as creating photographs with lab chemicals and light.




**Man Ray's elliptical lips and other evocative images light up the small screen.**

The good news? The soundtrack is intelligently presented, and the images are extraordinarily high-resolution.

The bad news? The designers of *Fautographe* have a dadaist love of the irrational, as exemplified by the program's inane organization. Images of artworks are grouped into nine categories, several of which seem meaningless. Films are reduced to puzzling stills that reveal nothing about the dadaist attack on logical narrative. And instructions on how to use this CD-ROM are vague and elliptical.

Despite these failings, *Fautographe* enchants. What other CD-ROM can light up my monitor with images of naked bodies radiating electrical waves as if they were Tesla coils? What other artist painted lips floating like a blimp over a pastoral countryside? Who else, decades before pop art, hammered tacks into the flat plate of an iron, creating the perfect tool for the Marquis de Sade's "ironing day"? *Man Ray Fautographe* turns your computer into the ultimate dream machine. – *Norman Weinstein*

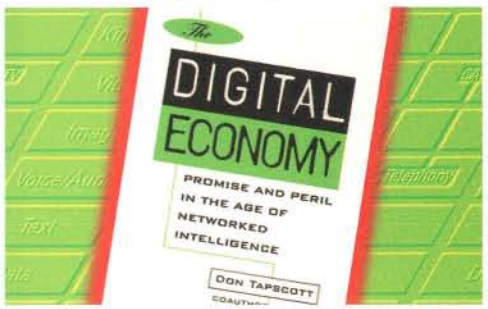
*Man Ray Fautographe* CD for Mac, PC, or CD-i: US$39.95. D&D Computers: (800) 816 6848, fax +1 (305) 220 3368.

## Workers of the World, Get Wired!

**The fad in business these days is to "reengineer" your company. This is accomplished by spinning off business units and flattening middle management. Every morning, we see the results of this fad as we read that AT&T, Kodak, or some other corporate entity is sacking 50,000 employees. Reengineering is like hitting a company with a neutron bomb: the buildings are still standing, but the people are gone.**

**Instead of showering companies with pink slips, recommends Don Tapscott in *The Digital Economy: Promise and Peril in the Age of Networked Intelligence*, rewire them into digital nets and spread these nets far and wide. Send computing power out the door into networks that democratize corporate structure and amplify workers' contributions. This "collective, networked, virtual force" is the real engine for social growth, Tapscott says.**

**A Toronto-based cyberguru to numerous *Fortune* 500 companies, Tapscott has packed his book with**




Bomb the data center, not employees.

**stories about businesses that succeeded – and others that failed – in getting wired. The computers used by Boeing engineers to design its successful new 777 jet were programmed with criteria supplied by Boeing's customers. FedEx has grabbed market share by allowing people to tap into the company's real-time parcel-tracking system. On the other side of the equation are cautionary tales of the millions of "virtual aliens" employed by American companies to keyboard data in Shanghai, New Delhi, and Hong Kong.**

***The Digital Economy* will be big among information technocrats, but the book is cogent enough to deserve a larger audience. For US$24.95, Tapscott maps the same terrain that he charges his corporate clients $100,000 to go over, making this book a bargain. – *Thomas Bass***

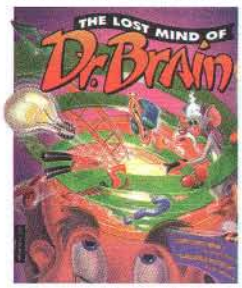
*The Digital Economy: Promise and Peril in the Age of Networked Intelligence*, by Don Tapscott: US$24.95. McGraw-Hill: (800) 722 4726, on the Web at *www.mcgraw-hill.com/*. Also check out Tapscott's international oxymoron database at *www.mtnlake.com:80/paradigm/moron.html*.

## Puzzle Heaven

I loved puzzles as a kid. I couldn't get enough of them – word-search books from the supermarket checkout line, Douglas Hofstadter's puzzle column in *Scientific American*, various plastic and metal gizmos – and I completed them all in a flash.

It's a shame they didn't have *The Lost Mind of Dr. Brain* back then, because I would have gone nuts for it. This CD-ROM describes a freak lab accident that has drained Dr. Brain's intelligence into his lab rat, Rathbone. To get the doctor back to normal, players complete 10 puzzle areas. To get credit for an area, you must solve between 7 and 20 individual braintwisters.

The instructions aren't great, but trying to figure out what's going on is part of the fun. My favorite puzzle area is Train of Thought. Colored balls move along a complicated pattern of train tracks. With five to ten of them moving at once, you click track switches to get the balls to the finish in the right order. Dr. Brain's niece, Dr. Elaina, offers hints.




**Playpen of the mind.**

*The Lost Mind of Dr. Brain* is recommended for puzzle fiends age 12 and up. One 12-year-old friend of mine rated it "totally cool!" I just wish they'd had stuff like this when I was a kid.
– *Amy Bruckman*

*The Lost Mind of Dr. Brain* CD-ROM for Mac and Windows: US$44.95. Sierra On-Line Inc.: (800) 757 7707, fax +1 (206) 642 7617, on the Web at *www.sierra.com/*.

STEWART BRAND; THOMAS VICTOR

## README *On the bookshelves of the digerati*

**STEWART BRAND** *is an author, a wired philosopher, and a co-founder of the* Whole Earth Review *and The Well.*

***Civilization of the Middle Ages*, by Norman F. Cantor.** "One of the all-time great history texts has been revised recently. So many of our institutions and habits of thought – monasteries, universities, and romantic love – date not to the Enlightenment or the Renaissance but to medieval cultural inventions. It is a revelation to examine – like watching a video of one's own birth."

***The Western Canon*, by Harold Bloom.** "It's like going back to a superb college, without any of the impediments of bureaucracy and torturously real-time lectures. Bloom has good, strong, hard-earned, intensely original opinions on all the great writing and what makes it great. He made me reread Shakespeare, got me listening to Gilbert and Sullivan, and damn near persuaded me that the main author of the Old Testament was a woman."

**MOIRA GUNN** *produces and hosts* Tech Nation … Americans & Technology *on NPR and reads around 100 books a year.*

***The Motley Fool Investment Guide*, by David and Tom Gardner.** "This is the first book I've read about investing that wasn't stuffy and didn't assume that the stock market is the most interesting place on Earth. The Gardners are very original, and I think they will really influence how people invest in the future. I am now looking at my investments with renewed interest. Then again, I started taking vitamin C after I interviewed Linus Pauling, and that only lasted three months."

Stewart Brand

Moira Gunn

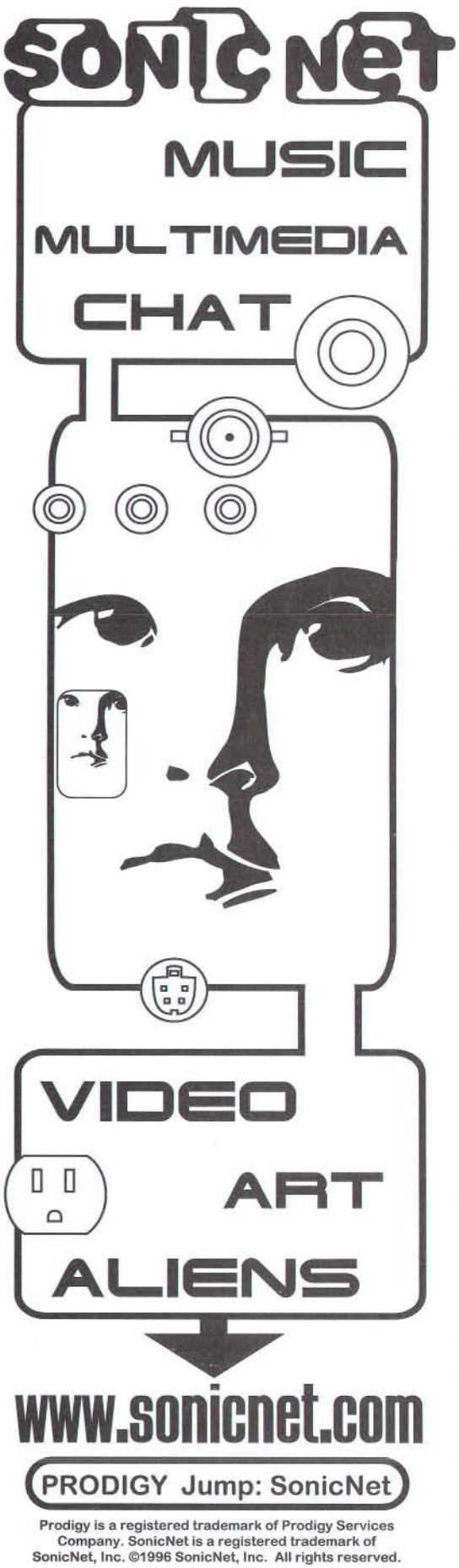
Rick Smolan

***Dinosaur in a Haystack*, by Stephen Jay Gould.** "Gould is a very rich writer in that there are always 52 topics going on at the same time. It reminds me of Buckminster Fuller's speaking style – he'd begin on one subject, veer off to another and another, and then somehow reel you back in at the end. Gould's perspectives on life are as valuable as his perspectives on natural history. But this isn't the kind of book you read straight through; you revisit it many times and dip into different essays. It's a valuable bathroom book."

**RICK SMOLAN** *publishes his photographs on paper, CD-ROM, and the Web. View his most recent project,* 24 Hours in Cyberspace, *at* www.cyber24.com/.

***The Coming Plague*, by Laurie Garrett.** "I've never read a book that gave me goosebumps as much as this one. We are the first generation that believed all diseases were curable. But many diseases that we had thought were eradicated are popping up all over the world, in strains that are resistant to antibiotics. And these days an infected person can get on an airplane, spread the disease through the air-conditioning system, and infect a geographical area 3,000 miles away. The world is shrinking."

**Photo District News Web site *(www.pdn-pix.com/)*.** "Photographers often aren't happy with the images that get printed. But they are suddenly realizing that they can self-publish on the Web – no paper, no printing, and no postage. Now they're telling their own stories. The PDN site is a great example of this."



## It Lives!

Enhanced CDs are a great idea: music and cool stuff on one disc. But most of them suck. Thankfully, some clever souls are hard at work creating bona fide art for the format.

*It* is the first enhanced CD from the people at Think Electric, a graphic design and multimedia firm in London. The disc is chock-full of clever time-wasters ideally suited for those situations when you find yourself staring blankly at the computer screen.

The CD-ROM segments are interactive oddities. More often than not a click of the mouse sets a mysterious action in motion. One section features a screen of guitars

**Interactive oddities.**

that opens up to reveal layer upon layer of an ambient suite. Half the fun is searching for ways to escape a section; when you get back to the main screen you feel like patting yourself on the back. The three music tracks, by obscure bands such as Bonjour Monsieur Basie, range from experimental electronics to ambient jazz.

Think Electric promises regular installments. My mind wanders at the thought. – *Scott Taves*

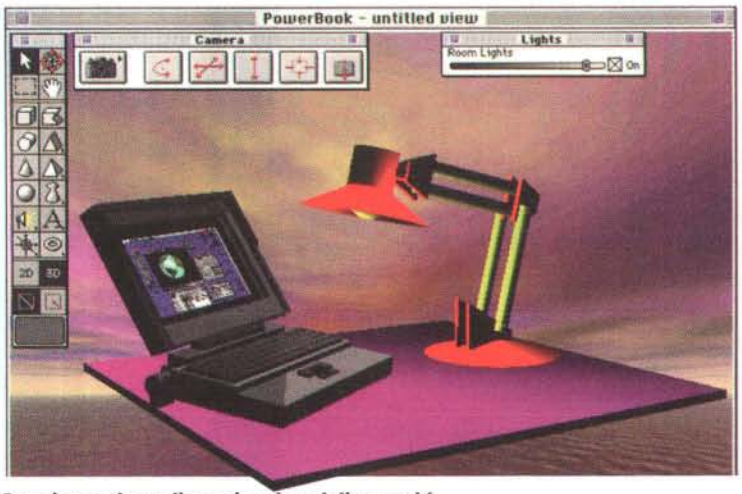
*It* enhanced CD for Mac and PC: US$11.99. Think Electric: +44 (0181) 960 1319, fax +44 (0181) 964 3457, email *rcm@channel.co.uk.*

## Breaking out of Flatland

Until recently, only expensive and difficult-to-learn graphics programs gave artists the ability to build three-dimensional objects. Microspot USA, a small company out of Saratoga, California, is changing that with a 3-D modeling program that is simple, agile, and cheap.

3D World is faster than massive high-end programs, hundreds of dollars cheaper, and wa-a-ay easier to use. Even I, a marginally talented 3-D artist, could create a beautiful goblet (well, almost beautiful) in a few minutes, drag on a satiny texture, and tip and turn it to watch the shadows slide down the inside and across the bottom. With more expensive packages, this took hours. Artists, amateur designers, and desktop publishers unwilling to climb the learning curve of more complex programs will love this one.

3D World comes with a set of primitive shapes and a lathe for quickly turning out symmetrical objects, from pie plates to models of human DNA. It doesn't have a thousand settings for shading, texture mapping, infinite lighting, or tweaking complex Bezier curves (but it does pretty good curves just the same). Those things take up memory and CPU cycles, even on a Power PC. Textures in 3D World can be imported from any PICT image, desktop pattern,




**Drop into a three-dimensional modeling world.**

or background texture you have lying around – just drag them onto the object and they wrap around it. An included lighting director plug-in lets you click where you want the spotlight to shine. You can add text, sounds, even URLs. With Net addresses, just click on the object and your browser will take you there.

3D World makes all this happen so quickly and painlessly because it's one of the few consumer 3-D graphics programs based on QuickDraw 3D, Apple's Power Mac system extension for creating, viewing, and manipulating objects in three dimensions. Rendering is real time – no waiting required. If you have an Apple QuickDraw 3D accelerator card, it even happens full screen. 3D World runs a bit chunky on slower machines without accelerator cards.

Send in your registration for plug-ins, including a fractal mountain generator, a bomb (that blows up your work), and random color.

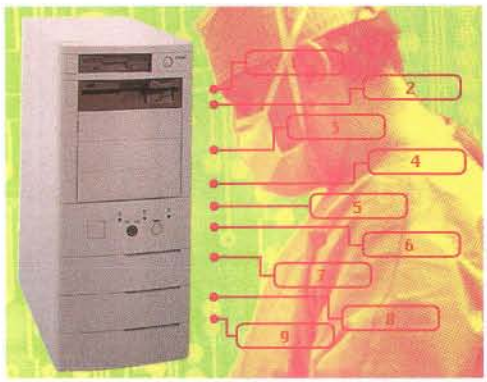
Playing with 3D World is almost as good as being with Homer Simpson when he was sucked "into that hypothetical third dimension" and dropped into an erotic bakery. – *Rob Swigart*

3D World for Power PC Macintosh: US$139. Microspot USA Inc.: (800) 622 7568, +1 (408) 253 2000, fax +1 (408) 253 2055, email *microspot1@aol.com*, on the Web at *microspot.inter.net/microspot/*.

## Quick-Change Case

**If you replace computers instead of upgrading them, you spend a lot of extra money. You also miss out on the fun ... well, OK, more like the agony. Problem is most cases make you take almost everything apart when all you want to do is change a component.**

**My old PC case stood between me and my upgrade path. I'd already spent contorted hours disassembling it enough to change a drive; changing a motherboard was unthinkable. Then I found JDR's Case-175, a tower "designed with upgrades in mind." And so it is – external and internal drives mount on slide-in brackets, allowing you to install the mounting screws before you put the brackets into the case. The motherboard swings down, so you can change its RAM and processor, reset its jumpers, or even replace it altogether without taking out the drives first. A delight! The case is set up**




New outerware for your hardware.

**for the usual eight-slot motherboard, and it holds nine drives: five on the outside, four on the inside. The case even has a built-in fan to supplement the one in your power supply.**

**The front panel's styling may not impress you, but it sports a key lock, a reset switch, and an on-off switch. (Most cases have just one or two of those features.) The only glitch is the push-button on-off switch: it's not supplied, and those on many power supplies (including mine – and even some of JDR's) won't fit. If your switch is a rocker or paddle type, you might want to order JDR's with the case. RadioShack has nothing like it, but I found one for US$10 at a local electronics store that carries computer parts. – *Ivan Berger***

Case-175: US$79.95 plus shipping. JDR Microdevices: (800) 538 5000, +1 (408) 494 1400, on the Web at *www.jdr.com/JDR.*

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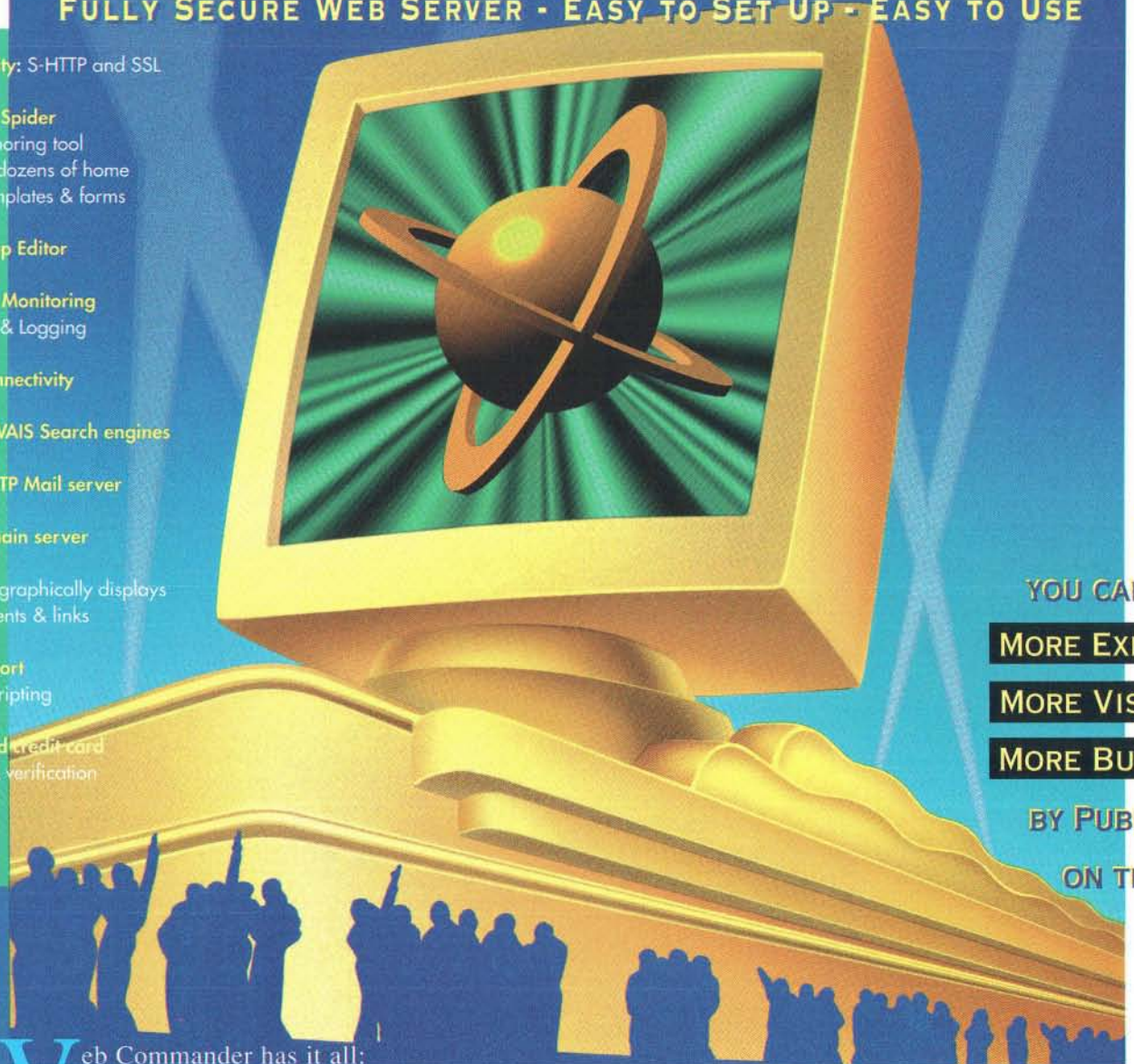

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**1. Micropayment Schemes**
Like so many other ideas, the concept of micropayment is attractive until you sit down and think about it. Ted Nelson first called it "nanobucks." The idea was that every time you read an essay or viewed an image over a network, you would be charged a few billionths of a dollar. These micropayments would both be tolerated by users and add up to enough to satisfy publishers. The problem, as 20 years of failed attempts have shown, is that such charges *aren't* tolerated by users. Web sites desperate to make money had best start looking elsewhere for ideas.

**2. DVD**
The big consumer electronics companies are so excited about DVD (digital video disc) that they're probably going to ruin it. They don't want DVD to become just one more low-margin gadget, so they plan to price it high. An understandable desire, sure, but if DVD players end up staying at the predicted US$800, who's going to buy them? Consumers are sick of replacing their albums, cassettes, and CDs with newer formats – and I guarantee that nobody is going to buy a DVD player when the only advantage over a VCR is that you can watch movies on a PC.

| This Month's Overhyped Memes | Hype Level | Position Last Month | Expected Lifetime |
|---|---|---|---|
| Micropayment Schemes | | 0 | 6 months |
| DVD | | | 5 months |
| Quantum Computing | 0 | 0 | 12 months |
| Bashing ATM | | | 6 months |
| Web Annotation | | | 11 months |

0 = Embryonic meme = Meme on the rise = Mass-media meme = About to die from overexposure

## HYPE LIST

**3. Quantum Computing**
It's a common academic path: smart, young undergrad enters as a physics major, grows sick of endless theorizing, joins the computer science department where theories can actually be tested. But, perhaps in revenge, physicists are now infiltrating computer science. Their Trojan horse? Quantum computing. Like modern physics, quantum computing is pure theory, untainted by lab work. OK guys, we know the physics job market is bad, but couldn't you have gone into biology instead?

**4. Bashing ATM**
Remember how, just last year, everyone thought asynchronous transfer mode was going to save the world? Well, that fanatical boosterism has quickly transformed into rabid bashing. The protocol for everyone has turned out to be the protocol everyone loves to hate. The LAN folks don't like ATM's flow control, and the Internet folks don't like its circuit-switched nature. Even the telcos don't seem that happy anymore. As one engineer told me: "Remember OSI? ATM is an even bigger disaster." Maybe it really does stand for another terrible mistake.

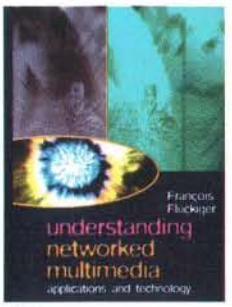
**5. Web Annotation**
Pundits like to say that the Web suffers from the neutron bomb effect: lots of buildings but no people. Taking that to heart, a number of start-ups are developing software that enables users to attach public comments – reviews, new links, whatever – to any Web page. They are also working on tools that will allow people who happen to be on the same Web page at the same time to talk together. Nice ideas – if people had anything to say to each other. But if the contrasting fortunes of Usenet and the Web tell us anything, it's that "community" is way overrated.

**– *Steve G. Steinberg* (hype-list@wired.com)**

## Inforama

Multimedia is unfair to parents. Time was when you could explain all about radio to your curious offspring. It's a bit different when today's children demand, "Tell me how it works," after you've configured your Web browser to use the hardware MPEG-2 decoder. You can bet François Fluckiger's kids know. Fluckiger is deputy head of networking at CERN, a professor at the University of Geneva, and now author of *Understanding Networked Multimedia: Applications and Technology*. This is not a man, one suspects, who spends much time fiddling with config.sys.

The book progresses from defining multimedia in terms of its Latin etymology to the intricacies of broadband




**Kid stumper.**
ATM. And it lives up to the claim that little prior knowledge is required – but blink, and you've missed a discussion of latency in audio stream multicasts.

Yet *Understanding Networked Multimedia* is a tremendously useful reference work, especially if you deal with hairy-armed information engineers. It even works with kids: if their persistent requests aren't satisfied with "Because," give them a quiz on H.261 color difference subsampling. Domestic peace, guaranteed. Thanks, François.
– *Rupert Goodwins*

*Understanding Networked Multimedia: Applications and Technology*, by François Fluckiger: US$45. Prentice Hall: (800) 947 7700, fax +1 (515) 284 2607.

## Street Cred Contributors

**Thomas Bass** is the author of *The Eudaemonic Pie* and *Reinventing the Future*. His next book, *Vietnamerica*, will be published in the spring.

**Ivan Berger** *(72040.15@compuserve.com)*, technical editor of *Audio Magazine*, has been writing about audio and other aspects of electronics since 1962. As an Altair owner in 1976, he was one of the first with a home computer.

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**Glen Helfand** writes about art, culture, and technology for various publications including *New Media*, *The Advocate*, *LA Weekly*, the *San Francisco Examiner*, and *Some Weird Sin*.

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**Paul Semel** *(beerhound@aol.com)* edits reviews for *huH* and writes them for *Bikini*, *Wired*, *Ray Gun*, *Sound Views*, and *HotWired*.

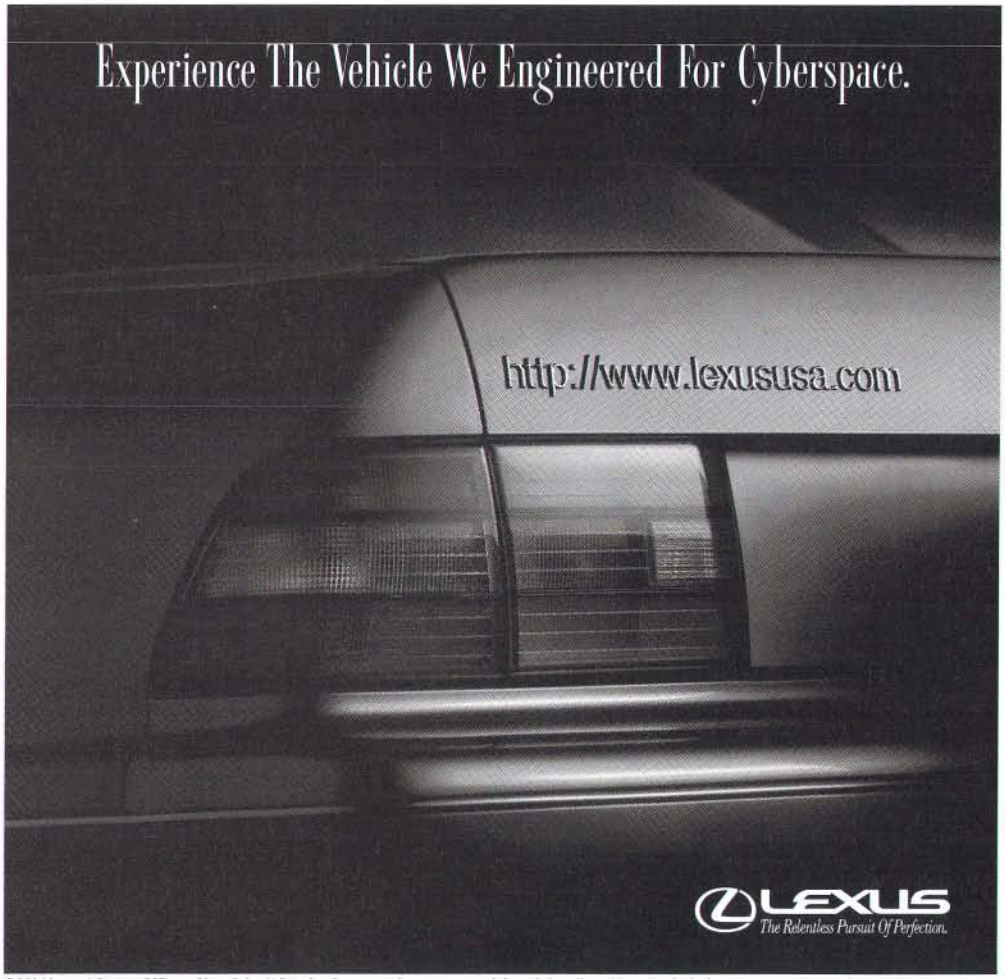
**Dan Sicko** *(pp002580@interramp.com)* writes about and listens to techno and hip hop when he's not in the do-jang.

**Dean Suzuki** teaches music history at San Francisco State University, with an emphasis on 20th-century music and rock history. A radio programmer for KPFA in Berkeley, California, he also hosts a show devoted to experimental music.

**Rob Swigart**, a research affiliate at the Institute for the Future, is the author of *Portal*, an interactive novel from Activision. He plans to move to the 19th century sometime soon.

**Scott Taves** *(staves@interaccess.com)* is the US manager of B&W Music and The Blue Room record labels and author of *Pocket Tour of Games on the Internet*.

**Norman Weinstein** is a poet and music critic whose most recent book is *A Night in Tunisia: Imaginings of Africa in Jazz*.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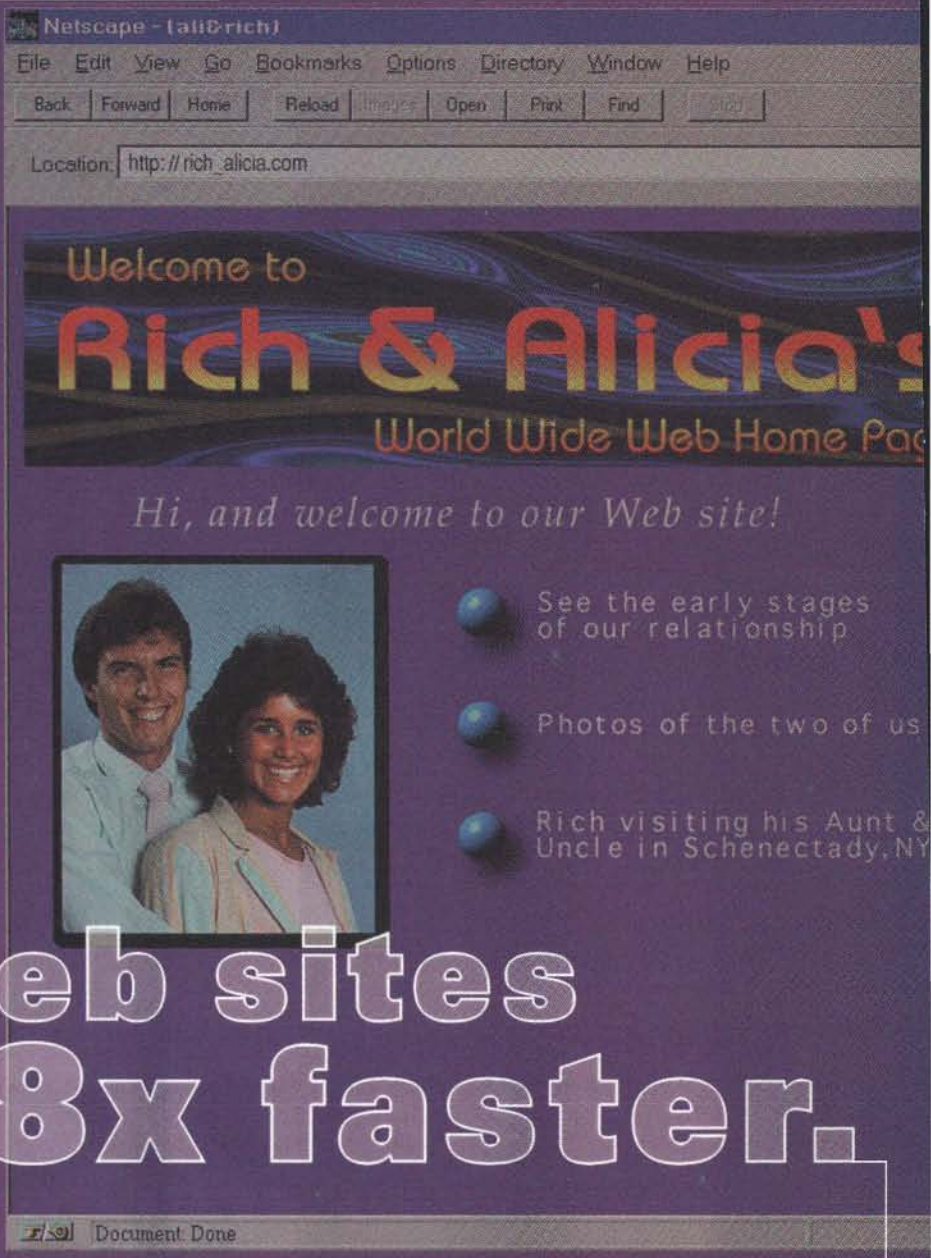


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# net surf

Edited by Kristin Spence

## Of Psycho(therapist)s and Oracles: Webbed Advice Never Tasted So Good

With psychotherapy rates hovering around a hundred bucks for that 50-minute hour, many of frail mental health have pursued alternate routes to professional counseling. Cybercouches are no exception: the treatment options that abound on the Net are mind-boggling. Online advisers come in more shapes and sizes than do the kinds of kids who eat Armour hot dogs.

Webbed advisers fall into one of two categories: those who supply instantaneous solutions and those who reply at their leisure. The first type are more often oracles than quick thinkers. These include *Joe's Magic 9 Ball, The Magic Infinity Ball, The Mystic 9-Ball,* and the *World Wide Web Ouija*. When I asked the *Mystical Smoking Head of "Bob" (www.resort.com/~banshee/Misc/8ball/index.html)* whether I should color my hair, he replied, confoundingly, "Better not tell you now." Dissatisfied, I went to *Ask Deep Thought (www.cvp.com /deepthought/),* which promises "a deeply enlightened answer and a biorhythmic chart reading." I typed, "Should I color my hair?" The reply: "The Judgment: The Clinging. Perseverance furthers. It brings success. Care of the cow brings good fortune." Which was nice, but it didn't really solve my problem.

I was most satisfied with the counsel I received from *Psychic Chicken (www.cjnetworks.com/admark/chicken.html),* who is not an instant oracle and replied by email: "I don't recommend coloring yer hair because it tends to break the crayons and don't ya just hate little stubby crayons?"

'Course, if you're looking for advice from someone you can trust – a familiar if squiggly face, say – you can ask Dr. Katz, TV's most animated psychotherapist. At the *Comedy Central* site *(www.comcentral .com/katz/katz2.htm),* Dr. Katz dispenses wisdom multiple-choice style, with an autodiagnosis form. When Dr. Katz asked how I felt, I chose: "How would you like me to feel?" He asked, "How long have you felt this way?" and it was a toss-up between "Ever since I got my modem" and "All of the above." The options for describing my childhood ranged from "Dark green" to "Tastes like chicken"; I selected "Underpaid." His analysis: "I find sometimes the best way to deal with problems is not to dwell on them, and release them, let them go. Say out loud 10 times, 'I don't have a problem, I don't have a problem,' and eventually the problem will disappear. Other versions of this mantra can work as well: 'No problem, no problem, no problem,' or 'Away fiend dilemma, away,' or 'Ooout, ooout, ooooout.'"

There are just as many crackpot therapists on the Web as there are in real life. Only difference is that these guys don't feign professionalism. *Ask Beepo (www.dca.net/~rwaters/askbeepo.html)* boasts: "Need advice? He's got it. Not great advice, but what do you expect for free?" Then there's *Mr. Bad Advice (www.echonyc.com/~spingo /Mr.BA/),* who told me that he is qualified to dispense advice because he was born and raised in Brooklyn. And, of course, there's geek advice. A brilliant (or so he tells me) operating-system designer, Melvyn *(access.advr.com/~geekchic/)* recently got a letter from a woman inquiring about the appropriateness of the pocket protector as fashion accessory. Her boyfriend had objected to her wearing it at a formal dinner. Naturally, Melvyn advised her to dump the jerk.

Come to think of it, these rash, flash judgments by goons who prefer not to waste time on their patients' particularities, opting instead for a prefab analysis, remind me of a certain Viennese doctor....

– *Erika Milvy* (erika@well.com)

PHOTO: DONNA COHEN/LIFT ONLINE

LIFT online

Volume 1.02 February 1996

A cultural magazine with a conscience, a savvy design sensibility, and a true community feel, *Lift Online* is down. Funkify your bad self at *www.lifted.com/.*

## A Networked Consciousness

In this era of burgeoning networked hypermedia, we draw closer to realizing the boundlessness of the unified mind. On the Web, we connect and are connected. We swim in imagination and bring the noosphere alive with collective consciousness. Netters eager to meld with such illuminative cyberspatial connections will find a deep whirlpool of possibility at *www.noosphere.com/*. Here, *A Space Without a Goal* acts as an intuition pump for the Electronic Frontier Foundation Consciousness archive. Dense with thought patterns for an evolving universe, the archive is an instantaneous, headlong rush into the meaningful essence of what all this webbing is truly about.

## Hotlinks to Hot Licks

*CDLink* may be the ultimate in liner notes. The interactive love child of the CD and the CD-ROM player, the Voyager Company's new shareware lets Web surfers access album reviews and essays with links that let the authors illustrate their points. By popping an audio CD in your CD-ROM drive and going to the corresponding site on the Voyager page, you can read Lewis Porter's take on John Coltrane's "A Love Supreme." One link in a piece on X's *Los Angeles* and *Wild Gift* brings you John Doe's "smooth voice" and a little crackle from Exene Cervenka's "tortured soul."

The selection of nearly 50 titles – ranging from The Beatles to Bon Jovi, Miles Davis to Deee-Lite – is diverse enough to match at least one disc in your private collection. And by using CD-ROM audio instead of the pokier Web sound applications, you don't have to wait 15 minutes for a 30-second sound bite. CDLink to *voyagerco.com/cdlink/cdlink.html*.

## Step Right Up

Where art thou, Tom Waits? The hipster's hipster who's spotted less than Elvis (but who's just about as cool) may not tour much these days, but that doesn't mean that those indoctrinated in the ways of Waits have picked up their bats and balls and gone home. With the recent release of the tribute album *Step Right Up: The Songs of Tom Waits*, Waits fever will soon be at its highest pitch in years. So what has the world's most iconoclastic songwriter/poet/raconteur been up to since last you spotted him in a Jim Jarmusch flick? To find out, step right up to the *Tom Waits Digest, www.nwu.edu/waits/*, a digital shot in the arm for the Waits lover in need of a fix. What's in it for you, you ask? There's plenty of info and links to newspaper and magazine articles about the artist's life and work, as well as news on the latest Waits sightings and nascent projects. Better still is a list of lyrics to scores of songs, including a "dictionary" that decodes some of his language. (Who knew that the "Big Black Maria" of which Waits speaks in *Rain Dogs* derives from a black woman named Maria who owned a crash pad and busted lodgers who misbehaved in it?) This site won't win any awards for design or organization, mind you: it's a pretty down-home, scruffy spot that somehow has its charms. Web imitates Waits. He wouldn't want it any other way.

## We've Got Spirit (Web)

If the pornography and get-rich-quick schemes riddling the Net are getting you down, elevate yourself by floating over to the *Spirit-WWW* at *zeta.cs.adfa.oz.au/Spirit.html*. You won't find the Web's inner child, but you will be blessed with a wide assortment of collected articles, essays, and images dedicated to higher consciousness. Whether you're seeking the truth (with a capital *T*) about astrology, channeling, UFO sightings, or yoga, the Spirit-WWW contains pages and pages of HTML-converted texts, lessons, pictures, movies, and information. It's a lucid, out-of-body, metaphysical experience with a dash of karma and cabala thrown in for good measure. Peace.

## Telescoping Space

In cyberspace, the Hubble Space Telescope is proving itself an important touchstone for instantaneous collective learning at *www.stsci.edu/pubinfo/PR.html*. Here, the *Space Telescope Science Institute* offers lots of Hubble pictures with background science for all starry-eyed virtual voyagers. Exploring the available material offers a chance to become more intimate with not only the neighboring planets of our solar system but the cosmic tapestry of the universe itself. Witness the birth and death of stars as you measure the distance to the most remote galaxy, probe clouds of intergalactic dust, and peer at the dark, mysterious void of a black hole.

If you haven't already followed one of the Net's many links to this incredible resource, don't waste another nanosecond. And while you're there, gaze on the embryonic stars in the Eagle Nebula. The faces found in the pillars of dense interstellar gas are nothing less than haunting.

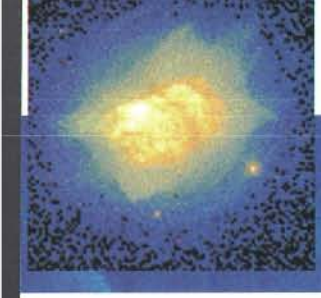
## Media on Media

Once upon a time, network broadcasting had style and grace. Not the shows, necessarily, but the studios in which they were made. The radio facilities NBC opened atop Chicago's Merchandise Mart back in 1930 were not only the most technologically advanced of their day – they also reflected a fashionable art deco elegance and helped make the city a broadcasting hub.

Don Ameche, Gary Moore, and Myron "Mike" Wallace worked in these creative nerve centers, which produced *Amos and Andy* and other classics. In the TV era, figures from Dave Garroway to Shelly Long went before the studios' cameras.

Rich Samuels was a reporter for affiliate WMAQ-TV when the network finally moved to a nearby skyscraper in 1989. Now reporting for the local PBS station, Samuels has created a virtual tour of the Mart facilities, reconstructed from historical documents and photos. Drop by *www.mcs.net/~richsam/home.html* to check out the golden age of broadcasting or just to see Hugh Downs with a mustache. But as Samuels warns, "Proceed quietly. It's very likely that a network broadcast is originating from one or more of the studios!"

PHOTOS LEFT: DON RAUL DOMINGUEZ



### There's No Excuse

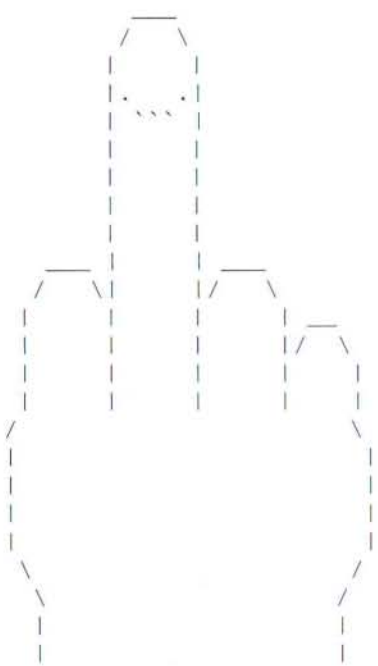
O. J. is free and Marcia Clark is our newest legal millionaire, but despite the consciousness raised by the Trial of the Century, millions of women are still being abused and killed by their partners each year. To keep up with an issue that's unfortunately going to be with us long after the last I-was-a-Simpson-trial-juror book deal is inked, check out the *Family Violence Prevention Fund*'s interactive Web site at *www.fvpf.org/fund/*. This beautifully designed spot offers easy access to action alerts, statistics, and information about domestic violence. A project of the people who have made "There's no excuse for domestic violence" the friends-don't-let-friends-drive-drunk slogan of the '90s, the site includes a quiz that tests the user's knowledge of domestic violence, its impact, its cost, and the most effective ways to combat the problem. Also just a click away: a number of interactive windows, including The Facts about domestic violence and Celebrity Watch.

### For Page Turners

While you may not be surfing, er, shopping for eggs or cheese on the Internet any time soon, you can get a head start on the 21st century at *Book Stacks Unlimited Inc.* Located at *www.books.com/*, Book Stacks Unlimited houses almost 400,000 titles available for purchase either online or via snail mail. If the convenience and selection alone aren't enough to entice you, there's more! Recent releases, the latest best-seller lists, and critical and interactive reviews await you on the shelves. Authors can frequently be found in the Book Cafe, a forum for discussing their work and yours (should you be interested in participating in an open workshop). Extensive help is available (although you'll need Netscape 2.0 to enjoy the Frames Format), and the site is updated daily.

### Cross-Referenced

Get the feeling that the Web is a cross between the smoke and mirrors of a seasoned con artist and a global game of high-stakes craps? Seek refuge in *The Electric Library (www.elibrary.com/)*, self-described as the Web's most comprehensive one-stop digital archive. Supposedly, it holds a repository with a searchable collection of 900 magazines, 150 newspapers, 2,000 books, and more than 18,000 photographs. Not enough for you? This "complete reference library on the Internet" also houses multiple encyclopedias, almanacs, and dictionaries. To test the site, I did a search on Kasensero, presumed to be the epicenter of HIV (see *The Hot Zone*, page 44). Four hits came back – from a radio broadcast, a magazine article, and two newspapers pieces. I tried a similar search on Alta Vista and got one hit – a complete story from *Le Monde*. (It looks like the library intends to charge for its services soon: the site references a price button.)



Censor THIS, Clinton!

### Random ASCII Art o' the Month

### Thanks to the *Wired* 4.05 Surf Team

Joel Brown *joelb@twinpines.chi.il.us*
John Makulowich *john@trainer.com*
John Reul *johnreul@aol.com*
Brent Sampson *brents@rmii.com*
Larry Smith *larrys@igc.apc.org*
Mary Elizabeth Williams *marybeth@well.com*

PHOTO TOP LEFT: R. SAHAI & J. TRAUGER (JPL)
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# Merchants

◂ 68 honestly at the state of his party and realized with deep horror that it had sold out its oldest friends, the rich, to bend the knee to social-conservative yahoos. The rich, too, can be radicalized by neglect of their interests. Being a Forbes, Steve would surely see this as a situation to be retrieved by the lavish expenditure of 40 million or so. A national-scale surrealist Forbes soirée.

Forbes had dual sets of New Hampshire ads. The first set featured Forbes himself, dithering on, all twinkle-eyed, about the twin unlikelihoods of "economic boom" and "spiritual renewal." In a companion ad, he was seen strolling through a field in woodsman's garb, flanked by his wife, Sabina. Forbes, who is not nearly so nuts as Ross Perot, can look relatively sane if the lighting is right. Unfortunately, though, he has a prim, crooked mouth, a lumpy face, fishy bespectacled eyes riveted to the teleprompter, and hair like the marcel wave of a '20s mah-jongg matron.

Mrs. Forbes, by contrast, is an almost touching figure in her blue Republican cloth coat. She shares her husband's weirdly orthogonal rack of teeth, but she looks as brave as any such deeply unlikely first lady is ever likely to look, infinitely more vulnerable and human than Hillary Clinton or Liddy Dole. It isn't the fault of Steve Forbes's five strapping daughters that they were born richer than Croesus, and I'm pleased to say that the Forbes girls looked like they were bearing up nobly under the strain.

Someone convinced Steve Forbes that he couldn't get respect unless he played political hardball on television. The result was the now-infamous Forbes attack ads, and they were a snide and nasty piece of work – not particularly sophisticated graphically but with an unsung genius of a narrator, a guy whose voice was authoritative yet also oozing cynical contempt. That's a tough, almost oxymoronic combination, but the guy pulled it off.

"Bob Dole," the narrator insinuated greasily, "voted to cut your Social Security COLAs but voted to raise his own pay US$23,000." It's palpably absurd to imply that Bob Dole skinned the elderly in order to line his own pockets. Dole's own motives aside, government budgets just don't work that way. Another Forbes ad cited purported tax hikes of the past 20 years or so as if Dole himself had singlehandedly rammed each one down the throats of a protesting House and Senate.

There must be millions of honest and accurate ways to attack Bob Dole and his long career of public service. You could easily claim that Dole has no ideas, or that he's in the pockets of Archer-Daniels-Midland, or that he's palpably old, tired, and out of touch. But to call Dole a career tax hiker and a personal greedhead is deeply cynical. Forbes's straw-man attack was not merely a negative ad against Bob Dole, but a negation of government itself – the despised "Washington values." It's as if we were all born yesterday, and had awoken to find our beloved nation suddenly dominated by octopoid Martians inside the Beltway. Forbes acted as if his audience had never voted before. He made his case as if they were just discovering the very idea of taking part in electing a government. Which is not at all true of the state of New Hampshire, although it's very true of Steve Forbes.

**Dole's five-point vision thing consisted of hunger and humiliation, jail, jail, more jail, and empty promises. Ceausescu had better PR than this.**

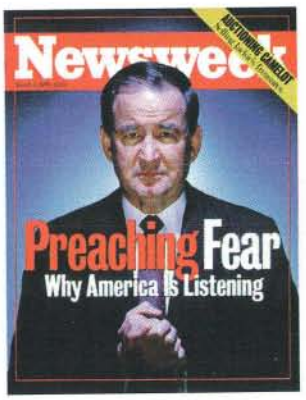
Bob Dole's New Hampshire ad campaign was shamefully bad. He palpably radiated a will to lose. It was embarrassing to have to witness a campaign this lousy. In 1980, Dole pulled down only 800 votes in New Hampshire. In 1996 he was running true to form, but with more money – so he could make even bigger mistakes. His own puff pieces were horrible. This, for instance, was his premier New Hampshire campaign ad, on "The Dole Agenda":

It began with Dole in tight close-up – the weird quiff, the split eyebrow, the incessant blinking, the lower teeth discolored and crooked – vaguely promising to deliver "fundamental change." There followed the game plan for Bob Dole's sweeping reform of the American social fabric: (1) "True welfare reform that puts people to work" (a street crowd including one or two black people, with Dole groping for the mitts of some potbellied hard hats); (2) "Abolish parole for violent criminals" (a grim blond female cop in shades; handcuffs snapped onto malefactor wrists in grainy black and white); (3) "Mandatory sentences for committing crime with a gun" (two vicious-looking white juvies, one in a camou jacket; cut to a handgun); (4) "Appoint conservative judges" who will end a "liberal judicial policy" (Dole in garage talking to New Hampshire hicks in John Deere gimme hats); (5) "Balanced budget that cuts spending and taxes" (flash of Liddy Dole gazing at Bob in adoration; fade to a dad walking aimlessly across a field with two sons in shorts and gimme hats). The tag line: "Bob Dole, the experience to change America."

What are we talking here? Where's the message? This ad was an unmitigated disaster, 30 seconds of rampant self-destruction. A doleful future, a dolorous America. It was Bob Dole as America's Undertaker, the Jailer of the Nation, soup-bowls and the hangman. The five-point vision thing consisted of hunger and humiliation, jail, jail, more jail, and empty promises. Nicolae Ceausescu had better PR than this, and they shot him on Christmas Day.

Dole's attack ads were almost as vicious and mean-spirited as Forbes's, but not as well done. They featured black-and-white bars slamming across the screen with the evil sound of jail doors crashing shut. "Steve Forbes: UNTESTED! *[Crash!]* NOT TRUTHFUL! *[Crash!]*" "Steve Forbes: UNTESTED! *[Crash!]* MORE LIBERAL THAN YOU THINK! *[Crash!]*" One shudders to think what rhetorical excesses these two would commit if confronting actual liberals.

Forbes was depicted by Dole as a ditzy, needle-nosed geek (not much of a stretch, admittedly) who wants to "destroy Social Security." A good scare tactic, maybe, but what do we associate with Dole after that? More hunger, more panic, this 162 ▸



# NONE OF THE ABOVE.

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# Merchants

◄ 160 time for the old and the weak.

Bob Dole is not a stupid man. He thinks on his feet and he has a sense of humor, of sorts. He's been re-elected in Kansas since the year zero. He did a terrific job sabotaging and then annihilating the Clinton agenda before the Man from Hope had realized he was knee-deep in unappeasable right-wing alligators. Dole's failures can be attributed only to himself: to that mysterious "Bob Dole" entity he's always invoking in the third person.

## Then there's Buchanan.

Big deal, right? Buchanan's a journalist! Never been in office! George Bush crushed Pat Buchanan like a bug.

But Buchanan makes Bob Dole look sick and weak and tired. In fact, Buchanan makes all his rivals look wretched. Buchanan's New Hampshire ads seemed to emanate from another reality entirely, from a world where ads are actually created to directly affect the opinions of voters.

Buchanan's ads are by far the best in the race, and New Hampshire was no exception. Television is the man's best friend. The best Buchanan ad opened with grainy scenes of industrial dereliction. The vibe was *Mad Max* with a deft touch of *Eraserhead*. Factories closed in montage. Empty, wind-rattled chain-link. And Buchanan's own voiceover. Jobs shipped to Mexico. A record trade deficit. NAFTA, supported by Dole, Gramm, and Forbes. Cut to Buchanan, sitting not in an office but in a pretty good replica of a typical lower-middle-class den. Promising to annihilate NAFTA and put American workers first.

It was not a true classic to rank with, say, the anti-Goldwater nuclear-destruction-of-a-little-girl spot. But it accomplished good, solid, political-ad things. It seized on an issue. It said one thing only and said it repeatedly in slightly different ways. It made a promise of specific action. It cut Buchanan out of the pack. It was memorable. It used the candidate's own voice and face. He looked as if he was speaking his own words rather than reciting those of someone else.

Similarly, the Buchanan attack ad on Dole was a very good attack ad. It featured a vapidly grinning, apple-green Bob Dole, with an epicene soundtrack of twittering violins in the background. Phrases scrolled gently by: *Big Congressional Pension, Raise Taxes, Raise Federal Debt Ceiling* – all simple, yet effective. There was no mention of Buchanan himself other than the required paid-for tag line. He beat Dole like a drum without appearing personally responsible.

New Hampshire governor Stephen Merrill, doing an eager-young-beaver stand-in for Dole, said that "Buchanan's own statements make him unelectable." But Buchanan countered that argument in an ad of his own: "No one stood with us then, but they all sound like us now." That's a fair assessment. The Republicans do all sound like Buchanan, to the extent that they dare to. Of course, they have to stop a little short, because the only way to out-Buchanan Buchanan is to break right down and sound like David Duke.

"A mudslinging millionaire, a grumpy Texan, and a senator who's been in the Senate since before I could vote!" That was the trenchant assessment in an ad for Lamar Alexander, whose sunny detachment from grim reality was demonstrated by his refusal to even mention Pat Buchanan. On paper Alexander looked good – the folksy small-town charm of Jimmy Carter, a state-based industrial policy (of sorts), a vague willingness to acknowledge that we live in a biosphere. But one has to wonder about a former US education secretary who vows to abolish the Department of Education. Alexander was negating his résumé faster than he was generating it.

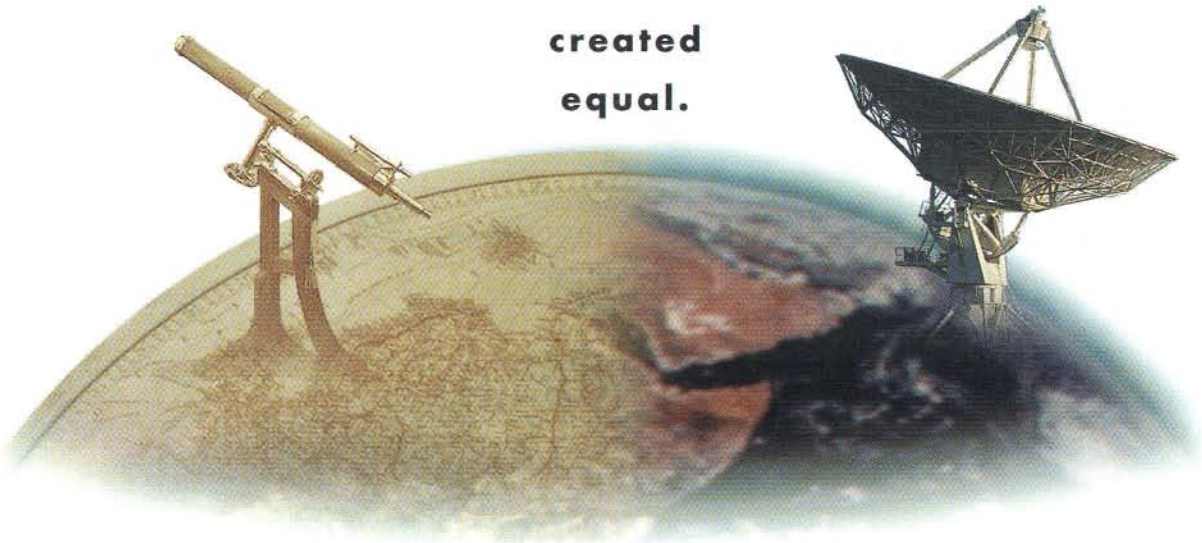
**The Buchanan attack ad on Dole made no mention of Buchanan himself. He beat Dole like a drum without appearing personally responsible.**

Forbes curb-stomped Alexander with a cruel ad proclaiming that Alexander had turned a $1 investment into $620,000. That's exactly the kind of stunt Forbes would trumpet to the skies as a triumph of capitalist wisdom and foresight in *Forbes* magazine. However, on the Forbes scorched-earth campaign trail, this became a "sweetheart deal." Dole, for his part, shamelessly Willie Hortoned Alexander with a claim that Alexander allowed violent Tennessee criminals to gain parole too early.

Alexander's own ads, meanwhile, were full of flat, creaky, pep-talk platitudes, carefully devoid of substance or any shadow of intellectuality. Alexander just isn't good-looking enough to get away with that sort of Dan Quayle vacuity. The fact that he was saying basically nothing, taking no chances at all, gave one time to concentrate on his expression, and with close study one realized that Lamar Alexander has a very peculiar face. At first glance he seems like Jerry Ford without the physical grace – a man forced to add an exclamation point to his own name to force a little typographical excitement (!). Freeze-frame the video, however, and try the old psychological trick of examining each half of his face separately: a dual personality swiftly emerges. The left face (the viewer's right) has the eager, fixated, microphone-clutching look of Art Linkletter, with a left eyeball that widens ominously even as the right eye squints. The right half of Alexander's face belongs to another man entirely, a lost, dull, and deeply confused soul, with the snuffed-out look of a defeated high-school lacrosse coach.

Amid these supposed powerhouses there was the tire magnate Morry Taylor, who ran a pair of ads endearing in their nutty brashness. In the first ad, Taylor, wielding a goofy Perot-style chart, proposed his own budget-balancing solution – simply fire the entire top third of the federal bureaucracy, leaving him as presidential dictator over millions of federal peons. In the second ad, the camera (which loves the man dearly) panned back in a walnut-paneled office to show the irrepressible Morry straddling a great chromed monster of a Harley Davidson – inside the office, mind you. This was an ad about free trade – being an American manufacturer, Morry's strongly agin it. He bore the triumphant air of a math 164 ►

All search tools are not created equal.



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# Merchants

◂ 162 crank who's claimed to square the circle without ever bothering to read Euclid. "I'm a manufacturer, not a politician or a lawyer," he boasted.

The shape of the proposed Republican future is becoming pretty clear, despite (or perhaps because of) the vacuous rhetoric of the candidates. Buchanan describes this vision better than the others, because he is most simpatico with fear, resentment, and neglect, with fortress walls and diminished expectations.

First: Take it as a given that the country has gone broke. Democratic congresses spent us into the poorhouse (we won't blame Reagan). Entitlements are frankly unsustainable; Social Security will do us in even if spiraling medical costs don't. We Americans will continue to pay taxes (unless we are rich), but only to service the debt; we will receive no more government services to speak of. The primary role of American government will be domestic discipline and punishment, along with intimidation of our many foreign enemies. Instead of GI Bills, scholarships, libraries, public TV, and other softheaded handouts, we will get moral lectures on sturdy self-reliance and the glory of "freedom from Washington." The country will be dotted with huge, thriving gulags, packed with elderly felons who will never see daylight again. Guns will be omnipresent, but to use one to steal will doom you for decades.

The Republican 21st century basically resembles the Confederate States of America. States' rights supersede the will of the Union. Tent-revival preachers wield unquestioned power, aided by satellites and direct mail. The money formerly spent on federal social work is funneled directly into the coffers of churches.

Easily packed school boards abolish the federally mandated curses of integration and evolution, to be replaced by "school choice" and creationism. Sex education vanishes forthwith, along with abortion, homosexuality, and other sex crimes. An invisible yet deeply feared black underclass is forced to work when useful, put in leg irons when unmanageable. Immigration is cut drastically. English is mandatory everywhere, of course.

The gentry, who live off the tax-free cream of absentee profits, dwell in a padded netherworld of mansions, quadrilles, hoopskirts, and Lear jets. Klan leaders are secret kingmakers, and militias thrive – with everybody a Colonel, in dashing, braid-heavy homemade uniforms that put the drab US Army to shame. An electronic Berlin Wall shuts the border to Mexico, ritually patrolled by a brand-new wing of the armed services, our first domestic police army.

**These guys make Bush look like a healer and a statesman. They make Reagan look moderate and conciliatory. Even Gingrich looks good.**

This is an attractive vision for a lot of people. Millions of Americans thought the Confederate States of America were swell. My hometown is festooned with fine bronze statues of brave men who fought and died to preserve the CSA. The fact that it was a lost cause only made them fight harder. Confederacy seemed plausible at the time, desirable even, and far better than accepting intolerable demands for change from a despised president in the enemy bulwark of Washington. The drift was accelerated when local Southern zealots lost their tempers, mounted up, and rode to the sound of the guns.

And now the Grand Old Party that won the Civil War confronts the vision of its future. Look at Bob Dole, who has been hunting the presidency since the Ford administration; he's been a heartbeat away from the job. But he's destroyed himself twice and is headed for three times in a row with the grim determination of Ahab on the *Pequod*. This goes beyond poor campaigning. It's like obsessive-compulsive behavior.

This time the guy truly had every advantage. Tons of money. A massive power shift to his own party in '94. Every conceivable endorsement, short of flyweight professional ideologues such as Phyllis Schlafly and William Bennett. The power, as majority leader of the Senate, to cripple adversaries and hold their interests hostage, which effectively kept other major figures well out of the race. There are no Dole bimbo eruptions, no Dole financial investigations, no embarrassing Dole book deal. He's a war hero. His second wife is probably smarter than Hillary Clinton, and though she's been in the Cabinet, she's ductile enough to look properly worshipful at rallies. Plus, she's good at soothing the Christian Right so Dole doesn't have to get too much of the sticky stuff on him. And Dole does have experience. He's old, but so are a lot of voters, and he doesn't look half bad for a man who was almost killed 50 years ago.

But Bob Dole is coming apart. This is a guy with no visible public idea of how to run the country. Presidents aren't supposed to be legislative dealmakers – that's a valuable skill, granted, but presidents are supposed to lead. If Dole can't campaign, can't lead, and won't quit, he'll very likely destroy the party.

But after studying the New Hampshire ads more intensely than anyone should ever have to, I reached a more basic conclusion: None of the Republican candidates revealed any aptitude for the presidency in 2000. Without exception, their messages were full of leaden promises, devoid of any positive or inspiring message, and galvanized with a deep, bitter, divisive, searing hatred of the competition. These guys make George Bush look like a healer and a statesman. They make Ronald Reagan look moderate and conciliatory. Even Newt Gingrich looks good compared with these guys.

It was Dick Lugar who said, in a New Hampshire ad, "Being a conservative doesn't mean you have to lose your common sense." Dick Lugar, the candidate of conservative common sense, who then fell right off the edge of the earth.

I can't see why it has to be like this. It's not that the Republican Party lacks leaders of ability who can successfully manage a federal government. The GOP could look beyond the present collection of viperous hucksters for its candidate. But I don't think the Republicans are up for this. I think they sowed the wind in '94, claiming a mandate when they were merely exploiting resentment, division, prejudice, intolerance, and confusion. In '96, they are going to reap the whirlwind. ■ ■ ■

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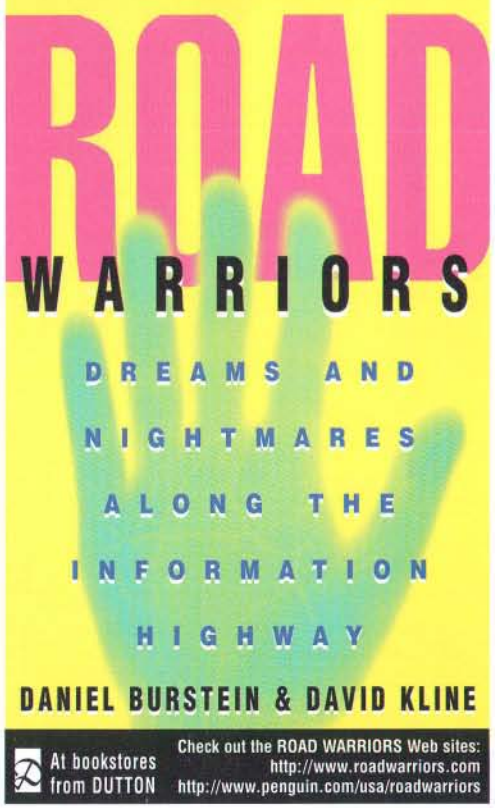


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# Ad Nauseam

◄ 68 all, I suppose, is an ad that leaves you with a negative impression of your opponent, without saying the words – or without voters ever recognizing that there was anything negative about the ad. That is, of course, sinister and effective advertising at the same time. The '92 Clinton campaign was very creative, very subtle, and very effective in its advertising. Clinton said a number of devastating things about George Bush, but he said them with a smile on his face. One of the reasons the '96 ads thus far appear to be so negative is that there's nothing subtle about them. It's like sledgehammer advertising.

**But you're not seeing the kind of serious public rejection of negative advertising that would force consultants and candidates to alter their behavior?**

Not enough to overcome the potential pluses of running the negative ad in the first place. It is just a plain fact of life that you can move more numbers with negative advertising than you can with positive advertising. Twenty years ago you had to think long and hard before you ran a negative ad, because there was going to be a predictable backlash. But television overall has become so negative that negative political advertising fits in with everything else you see.

**Is it possible to overrate the power of a really effective negative ad?**

Oh, sure. But here's the point: If I'm trying to win a vote, people have to know my personality and quite a number of issues about me in order to feel so positive that they are going to vote for me. But I can also win a vote for me by getting a vote against you. To get a vote for me, I've got to give them 10 or 15 reasons. To get a vote against you, it only takes one 30-second ad with a silver bullet. Positive advertising is a much more complex and difficult thing. One negative ad can do wonders.

**It almost makes you wonder whether positive advertising serves a purpose.**

Oh, absolutely there's a point to it. Particularly if the candidate, like Forbes or Alexander, is introducing himself. But I suspect that in most of the political world, the positive message is sort of nodded at and not really given much credit. Is it possible in this day and age for a candidate to get from here to there without running any negative advertising? Probably not. In fact, if you don't run some confrontational advertising, you're probably not considered strong enough to hold public office.

**The media are increasingly interested in the inner workings of the campaign process, and now even the candidates are talking openly about the mechanics – so much so that some people are saying that in 1996 the mechanics is the message. What effect does this have?**

It's self-deflating in a variety of ways. When politicians talk about tactics and how you're going to win rather than why you should win, it feeds public cynicism toward all of politics. If you're talking about political process – about your polls or about your opponents' deficiencies, about how you're going to drive somebody's negatives up or how you're going to drive your positives up – you're not talking about a positive vision of the future. Any candidate only has so much time, whether it's a 30-second ad or eight seconds on a sound bite or whatever it is, to communicate via mass communication to the public. And if you are "off message," then you're not doing the best you can. It is off message, in my judgment, to talk about the how of your campaign rather than the why of your election.

**To get a vote for me, I've got to give people 10 or 15 reasons. To get a vote against you, it only takes one 30-second ad with a silver bullet.**

**So why are candidates doing it?**

All campaigns ask, How are we going to get onto the nightly news tonight? And a good way to get on the nightly news tonight is either to attack your opponent or to get into political process and strategy and tactics, which the media just love to cover. Secondly, it's easier to create a little sound bite about the horse race or about your opponent than it is to create a sound bite – eight or nine seconds – that expresses a vision of the future.

**It's clear that there are at least two audiences for every ad – that is, the peo-** 168 ►

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**JUST BUILD IT.**

# Ad Nauseam

◄ 166 **ple at home and the media. When consultants set out to make an ad, which audience is actually the dominant one?**
Well, there are a lot of audience objectives. There are the primary voters, there are the media, and there are the general election voters. When you send an ad, whether it's intended for the media or the primary voters, you are making a big mistake if you think it's not going to be seen by general election voters, because this is how they get a first impression of your candidacy. Beyond that, campaigns these days make many ads that will never or almost never run. They are made in order to have a press conference about the ad, to show it to the media, hoping that the media will pick it up and put it on the nightly news. But the campaign doesn't put any dollars behind it. This frequently happens in Washington – they run the spot there and the media are supposed to assume that it's run throughout the world, which of course it never is. And then there are the ads that the campaigns produce hoping the media doesn't see them.

**You started out by saying that there is more advertising than ever, partly because of Forbes. Actually, in New Hampshire, Dole out-advertised Forbes in the end. The ABC affiliate in Manchester was airing 150 to 200 ads a day. In an already media-saturated environment, is pouring all those dollars into ads still an effective strategy? You can't help but notice that Forbes did rotten in New Hampshire, and Dole didn't do nearly as well as he was supposed to. Meanwhile, Pat Buchanan, who won the primary, bought maybe a tenth of the gross volume they did.**
The irony of those massive advertising buys in Iowa and New Hampshire is that they are the two states where substantial, on-the-ground campaign and organization is going to have as much, if not more, impact than advertising. I mean, in New Hampshire most voters have the opportunity to meet the candidates personally. But except for those two states, the power of advertising is overwhelming, and therefore the power of dollars is overwhelming.

**But doesn't the level of media saturation raise the overall stakes? This is a question that product advertisers face all the time – how to break through the clutter.**
The challenge becomes how to grab somebody's attention without being really weird – you don't want to be known as an oddball. But the days when you could stroll down the banks of some river, with calm music in the background, to demonstrate your commitment to the environment – those days are gone, because the couch potatoes with the remote control are going to turn you off. If you don't grab their attention in the first three or four seconds, they're gone before they even know whose campaign it is.

**What have been some of the seismic changes in the last 20 years?**
It is generally true today that if you run competent negative advertising, and your opponent does not answer it immediately with ads of his or her own, then your ads will be believed. That's exactly the opposite of the way it was 20 years ago. Back then, even the most competent negative spot tended to be disbelieved – the perception was you were so desperate that now you were going to throw mud. Today, you run a negative ad and if the other guy doesn't answer it, it's sort of proof that you must have been right. That is also one reason why there is such a fast change in ads these days. You run them for two days, then you change ads because your opponent has put up something to answer you and you have to answer that. And he has to answer you, and you have to answer him.

**The fact of the matter is, 10 years from now, people are going to register to vote online, and they're going to vote online.**

**What does that do to the accuracy issue?**
Remember that with television advertising, your audience is everybody who watches television. These folks are not necessarily going to get information elsewhere. They're not going to hear that something in your ad was bogus – and therefore you leave it on. Or it's not going to matter. I'm sure you remember, in 1988, Bush's ad against Dukakis, with Dukakis in the tank …

**He popped out of the tank, wearing a combat helmet and trying to strike a leadership pose, but instead he looked patently ridiculous.**
Yes – and in the Bush ad, there was a crawl across the screen with an announcer saying things that were absolutely wrong about Dukakis's positions on defense. One night, on the national news, ABC did an analysis of that ad which said, in effect, "Bush is wrong on this, wrong on this, wrong on this – it is a false ad." The Bush campaign had a big meeting to decide whether to keep the ad on the air or not. And they decided, "Well, to heck with it. ABC is going to run that report once. We're going to run the ad 2,000 times. So let's keep it on the air."

**What changes do you foresee for political advertising?**
The technologies of online and the technologies of television are going to merge more and more. Video-on-demand will be a part of our lives. I will be able to say, I want to know about Dole's views on NAFTA in the two-minute version, or, I want to know his views in the 10-minute version. The public demand is going to be there, and the technology is going to be there, and that's a vastly different politics. Although you might ask yourself who on earth would want to know the 10-minute version of Bob Dole on NAFTA.

**Can you give some examples of what the future will look like?**
The fact of the matter is, 10 years from now, people are going to register to vote online, and they're going to vote online. In 10 years' time, a member of Congress will be able to hold a town meeting with all of his or her constituents in their own homes, and the congressperson can say, 'Tomorrow, I'm going to vote on this bill. I'm going to describe it to you, and you tell me how to vote.' There will be those who abuse this system, but it is a magnificent means for people's involvement in the process. The political community is not fast to understand this, but online is as powerful a new communications vehicle as, in its own ways, television was in its day. Think of the power of communicating specific messages to specific constituencies through computerized direct mail, for example. 170 ►

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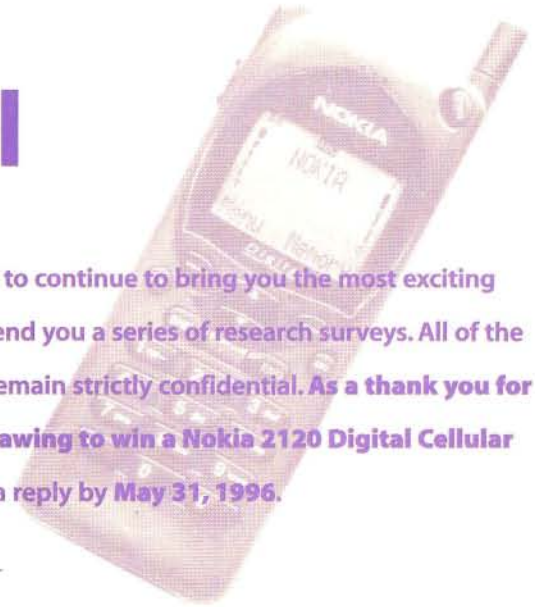
# Wired Reader Panel




**By joining the Wired reader panel, you are helping us to continue to bring you the most exciting magazine on the planet. Over the next year, we will send you a series of research surveys. All of the information you provide in the attached survey will remain strictly confidential. As a thank you for responding to this survey, we will enter you in a drawing to win a Nokia 2120 Digital Cellular Phone or one of 25 Wired T-shirts.** We'd appreciate a reply by **May 31, 1996.**

**Name:** _____

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**1. How did you obtain this issue of *Wired*?**

7-1 ○ Subscriber
-2 ○ Newsstand
-3 ○ Friend/Relative
-4 ○ Other (Please specify)

_____

**2. What is your gender?**

8-1 ○ Male
-2 ○ Female

**3. What is your marital status?**

9-1 ○ Single, never married
-2 ○ Engaged
-3 ○ Married
-4 ○ Separated/Divorced
-5 ○ Widowed

**4. What is your age?**

10-1 ○ under 18
-2 ○ 18–24
-3 ○ 25–34
-4 ○ 35–44
-5 ○ 45–49
-6 ○ 50–54
-7 ○ 55–64
-8 ○ 65 or older

**5. What is the highest level of education you have completed to date?** (Please check one only)

11-1 ○ Graduated high school
-2 ○ Attended college
-3 ○ Graduated college
-4 ○ Some graduate school
-5 ○ Graduate degree
-6 ○ Doctorate

**6. What was your approximate household income, before taxes, for 1995? (Please include income from all household members and from all sources, including salary or wages, profits, interest, dividends, etc.)** (Please check one only)

12-1 ○ under $50,000
-2 ○ $50,000–59,999
-3 ○ $60,000–$74,999
-4 ○ $75,000–99,999
-5 ○ $100,000–149,999
-6 ○ $150,000–199,999
-7 ○ $200,000–249,999
-8 ○ $250,000–299,999
-9 ○ $300,000–399,999
-0 ○ $400,000–499,999
-X ○ $500,000 or more

**7. If you are employed, what is your current job title?** (Please write in)

_____

_____ 13-14

**8. What industry are you currently employed in? (i.e. publishing, medicine, computer, telecommunications, etc.)** (Please write in)

_____

_____ 15-16

**9. Are you currently self-employed?**

17-1 ○ Yes, full-time
-2 ○ Yes, in addition to regular employment
-3 ○ No, neither

**10. Do you maintain an office at home for either personal or business use?**

18-1 ○ Yes, for personal use
-2 ○ Yes, for business use
-3 ○ No, neither

**11. In your current position, which of the following products and services are you involved in purchasing for yourself or for your company?**
(Please check all that apply)

| | For Self | For Company |
|---|---|---|
| Financial investments | 19-1 ○ | 20-1 ○ |
| Computer hardware | -2 ○ | -2 ○ |
| Computer software | -3 ○ | -3 ○ |
| Telecommunications Equipment | -4 ○ | -4 ○ |
| On-line services | -5 ○ | -5 ○ |
| Travel arrangements | -6 ○ | -6 ○ |
| Other (Please specify) | -7 ○ | -7 ○ |

_____

**12. Have you visited or are you a registered member of HotWired <http://www.hotwired.com>, the World Wide Web site?**

21-1 ○ Yes, registered member
-2 ○ Yes, have visited the site but am not registered
-3 ○ No, neither

**13a. Have you ever visited *Wired*'s site on America Online?**

22-1 ○ Yes
-2 ○ No

**13b. If no, would you like to receive an America Online disk for 10 free hours of online time?**

23-1 ○ Yes
-2 ○ No

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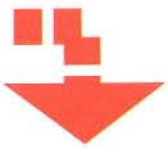

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# Ad Nauseam

◄ 168 **Wasn't this supposed to have been the first online campaign?**

Every campaign wants to have its own Web site in order to seem technologically advanced and because everyone else is doing it – you can't be a modern candidate without having your own Web site. The public can find commentary and information on the candidates' positions at PoliticsUSA and other media sites. But I don't think online has a significant impact at the moment. It really is an irony that in today's world, older-age people are disproportionately the largest share of voters, while younger people are disproportionately a small share of voters and at the same time the major users of online services. As the younger generations move into voting age, I think that you'll see more voting. And these future voters will be better informed, or at least have the capacity to be better informed, than any voters in any generation at any time.

**What's the biggest single change you've witnessed in political ads over the years?**

Probably that it's become very difficult to see an advertising strategy from beginning to end, because we live in this world where you've got to answer the other guy. So you throw up new ads, and Tuesday's ad may have nothing whatsoever to do with what was up there on Monday. It's very difficult to see any of these campaigns as having a common thread. Twenty years ago, you planned an advertising campaign and had different phases of the same kind of message so that you could build to a crescendo. The value of doing that, of being able to set a strategic course and follow it in your advertising, is that you could give the candidate a mandate for what he was talking about, make it possible for him to enter office with enough positive support that he might actually get something done. He would never have had to squander that support by having to run lots of negative ads. Today, what we are doing is creating a political campaign process that so injures the winner that he can't be an effective president – where he enters office having been sullied by the campaign process, both by his opponents' advertising against him and his own in response. ■ ■ ■

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# Indexing the Web

◄ 114 The spiders start with a list of a dozen or so known sites. They index these pages, then follow every link to every new page the sites contain and index those. The process repeats until the spider can't find any links in the Web that it hasn't visited. Back when the Web was young, when it contained only a few thousand pages, this procedure took less than a day. Now it takes even the quickest spiders three or four days to roam the entire Net. Alta Vista's spider, for example, downloads 2.5 million pages a day out of the more than 21 million it knows about. Won't the Web soon be so large, I challenged Brewer, that the index cannot be completed before more pages are added, making it perpetually out of date?

Brewer leaned back and flatly disagreed. According to him, we will just use smarter and faster spiders. After all, he pointed out, it's possible to get a 155-Mbps connection to the Internet. That means the entire contents of the Web can theoretically be sucked down in about five hours. Sure, the Web is growing, said Brewer, but so is available bandwidth. The real problem is that Web spiders spend most of their time waiting to connect to the Web site. It's a problem familiar to anyone who has tried to go to a popular site in the middle of the afternoon.

**In Inktomi, a document takes up only about 4 percent of its original space.**

So, to speed up the process, Inktomi uses multiple computers to crawl the Web. A few dozen workstations in the Berkeley computer science department are set up to start crawling the Web when nobody else is using them. By breaking the problem up this way, Inktomi can take almost full advantage of its Net connection. Inktomi also plans a few other tricks – for example, to keep track of which Web sites change most frequently and make sure it checks those sites every day. The result, taking into account the bandwidth increases that will be necessary to sustain the Net, is that crawling the Web will still be feasible in 2000.

OK. But what about storage? After all, you're trying to keep track of the entire Web! You're trying to store in one place the contents of hundreds of thousands of hard drives. In a few more years, that will have to be prohibitively expensive.

Not so, claimed Brewer, excited by the opportunity to showcase another advantage of his system. Remember that you need to store only the inverted index, instead of the actual documents. That makes for a great compression scheme: each occurrence of a word is represented by a single bit in the appropriate column. The result? In Inktomi, which uses some clever techniques to reduce the table's size even further, a document takes up only about 4 percent of its original space. Which means that even when the Web is a 174 ►

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# Indexing the Web

◄ 172 terabyte of text, a complete index will take up only about 41 gigabytes. You can buy that kind of disk space for less than $10,000 today.

Admittedly, Inktomi currently keeps track only of which words appear in which document – it doesn't know the order in which the words occur. That means Inktomi can't search for occurrences of "Clinton" within five words of "President," for example. However, it's an easy thing to add, said Brewer, and one he will add soon. Even with this word-proximity information, the index will still be only about 15 percent of the total size of the Web. (A consequence of storing word order is that indexes such as Alta Vista contain what is essentially a compressed version of the Web. This raises some tricky copyright questions.)

OK, OK, I was willing to acknowledge, storage might not be a problem. But it's not just the size of the Web that's growing, it's the number of users. What happens when everyone in the whole world is connected to the Web, and half of them are trying to use Inktomi at the same time? Perhaps computational power will be the bottleneck.

Definitely not a problem, Brewer insisted unflaggingly. Inktomi has been stress tested at more than 2.5 million queries a day with no difficulty – and that's with just four outdated workstations. Hook together 40 state-of-the-art computers and Inktomi should be able to handle 100 million queries a day – easy. Sure, the Web is growing exponentially, but microprocessors are on that same curve. Computational power is the least of our worries.

I left Berkeley convinced that indexing the Web, while likely to remain a challenge, won't be insurmountable. But after using Inktomi more, I started to wonder if an index really satisfied my desire for organizing knowledge. I could usually find what I was looking for, but I felt as if I was poking around in the dark. I remembered something Jerry Yang had told me at Yahoo!: "The difference between a catalog and an index is that a catalog provides context." That made sense now.

A catalog not only helps you find a Web site, it also tells you how it fits into the grand scheme of things. Yahoo!, for example, shows that the site for the United Patriotic Alliance belongs to Society and Culture:Alternative:Militia Movement. It also lists sites that offer an opposing viewpoint in that same section. And it includes a handy cross-reference to Society and Culture:Firearms. Doing a keyword search for the United Patriotic Alliance, on the other hand, doesn't provide any of that. It's like operating with blinders on: you can only see what's directly in front of you.

And, I found, there's another, more subtle drawback. Indexes not only don't provide context for the document, they don't provide context for the keywords. That's because the user can immediately jump to the page that contains a particular word. Using an online index, it's all too easy to find out what someone has said about, say, racism, and then quickly take that quote out of context. By allowing you to jump right to the good stuff, instead of forcing you to read all the way through the document, indexes promote scanning instead of reading.

**Excite learns about subject categories from the bottom up, instead of from the top down.**

Organizing knowledge with a keyword index is less like a universal library than like a giant, Burroughs-style cut-up poem. Pages become organized together for no reason other than random confluence of words. While indexes solve the problems of subjectivity and scale that plague classification schemes, they don't impose enough order. The more I tried to use Inktomi, the more I realized that operating just on words is too low-level. There needs to be something in between.

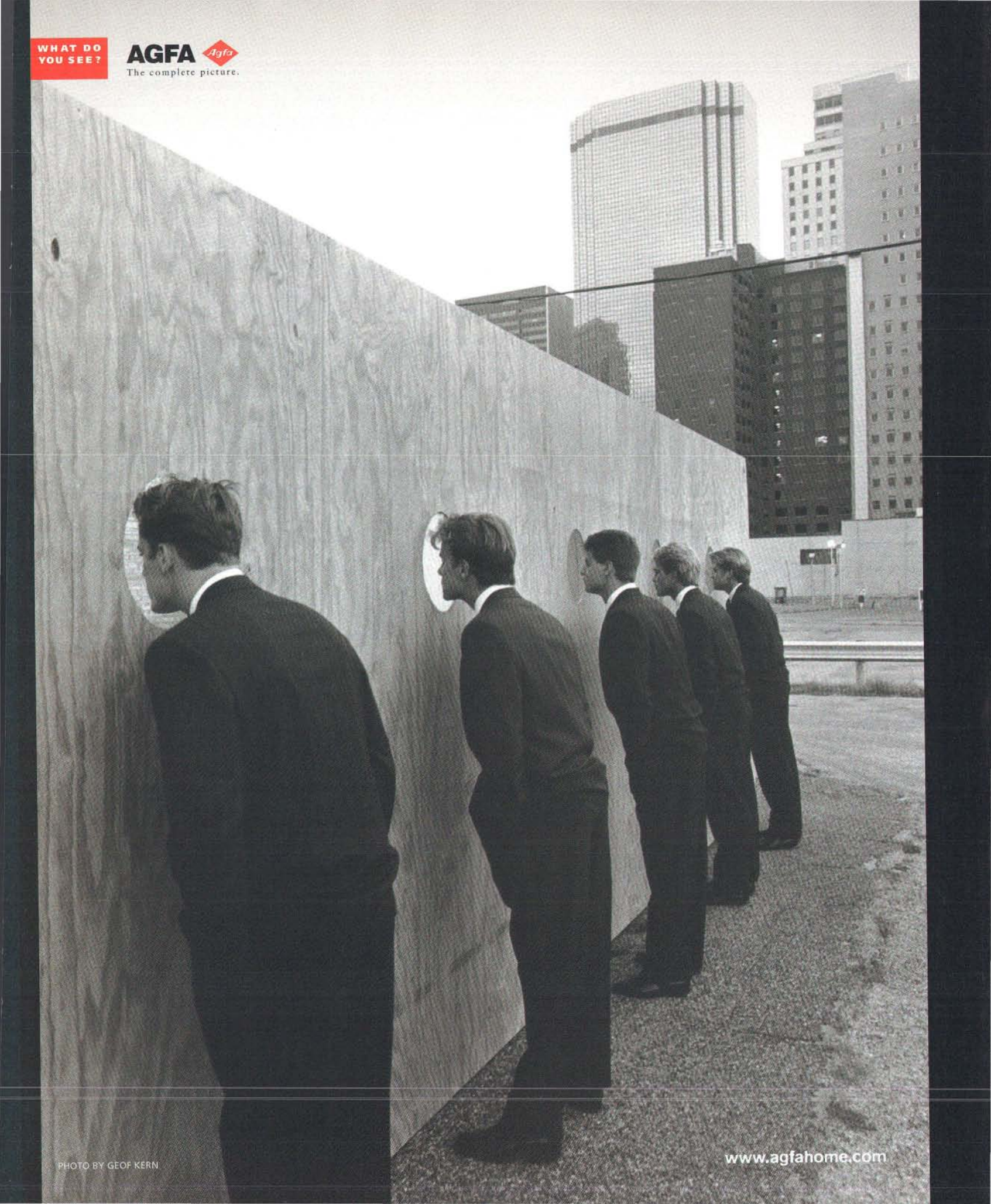
Finding that in-between has long been a goal of information retrieval research. Even in the 1960s, when online databases were puny by comparison, it was clear that simple keyword searching was inadequate. What was needed was some way to make sense of a document, to figure out what it was really about. But despite concerted efforts, nothing that really works much better has been found. That's why Architext Software's announcement last October of the Excite system *(www.excite.com/)*, which indexes the Web by concept rather than by keyword, was greeted with as much skepticism as enthusiasm.

For one thing, Architext had come out of nowhere. Founded in 1993 by six Stanford students, none with any real background in information retrieval, the company picked up $3 million from Kleiner Perkins Caufield & Byers and began to promote Excite's "concept-based searching." But Architext didn't release any details about how the system actually worked, nor did it enter the annual TREC competitions, where search engines compete head-to-head. In short, it looked like just one more case study on how the word "Web" has the ability to cloud investors' minds.

That's why I was so surprised when I met Graham Spencer, Architext's 24-year-old vice president of technology. Instead of the glad-handing salesman I expected, he was a self-described punk. Punk like I remembered from high school, when it meant not only the music you listened to but a certain earnestness and idealism, evidenced by impassioned fanzines, distrust of anyone who made money, and spray-painted anarchy symbols. Tall, ectomorphic, with tightly cropped hair, Spencer looked out of place in the cubicle-filled office. But, he quietly insisted, he has stuck to the punk do-it-yourself ethic by founding a start-up and making sure it offers a useful service "without fucking anyone over."

The actual service, it turns out, was decided somewhat arbitrarily. The company's founders knew they wanted to start a business but weren't sure what kind. It was Spencer who suggested they build a search engine, because "information retrieval seemed like the easiest place to make progress."

Of course, it says something about Spencer that he assumed he could make progress in a field that has been stalled for some 20 years. But it's a prevalent 176 ►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# Indexing the Web

◄ 174 attitude among computer scientists: Information retrieval is really only a problem for people in library science – if some computer scientists were to put their heads together, they'd probably have it solved before lunchtime.

The "problem" of information retrieval can actually be nailed down to two issues: synonymy and homonymy. The first is a problem because a search for documents containing the word "film" won't find documents containing synonyms such as "movie." Homonyms, words that are spelled the same but have different meanings, are a problem because the search will find documents containing "a film of oil."

**The "problem" of information retrieval can be nailed down to synonymy and homonymy.**

All efforts at improving information retrieval involve trying to remove these problems. For example, some of today's best systems – such as Cornell's SMART engine – use a thesaurus to automatically expand a user's search and capture more documents. Some also eliminate homonyms by trying to figure out how a word is being used in a document. This is done by collecting statistics on which words commonly occur together. This way, if the search engine sees the word "film" near the word "director," it can guess that the word is being used to refer to a motion picture.

When I quizzed Spencer on the actual technique Excite uses, he became noticeably more circumspect. On the one hand, he wants to brag about his system's algorithm so people don't think he's just full of hype. On the other hand, he doesn't want to give too much away. From what he did finally tell me, the system appears to use a fairly sophisticated approach. The idea is to take the inverted index of the Web, with its rows of documents and columns of keywords, and compress it so that documents with roughly similar profiles are clustered together. This way, two documents about movies will be clustered together – even if one uses the word "movie" and one uses "film" – because they will have many other words in common. The result is a matrix where the rows now represent concepts instead of actual documents. This cleanly attacks the problems of both synonymy and homonymy.

It turns out that the basic idea behind this approach was first developed in 1988 by a group of scientists at Bellcore, under the name Latent Semantic Indexing. The technique, although shown to be very effective, has been plagued by its heavy computational requirements. It's simply too slow for most practical applications. But, after all, that's what computer scientists like Spencer are good at. And what Architext has apparently done is find a way to perform LSI more efficiently. If so, it's a promising step toward improved information retrieval.

What makes Excite so exciting is that 178 ►


www.excite.com

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# Indexing the Web

◄ 176 it comes up with a classification scheme through statistical analysis of the actual documents. It learns about subject categories from the bottom up, instead of imposing an order from the top down. It is a self-organizing system. This eliminates two of the biggest criticisms of library classification: that every scheme has a point of view, and that every scheme will be constantly struggling against obsolescence.

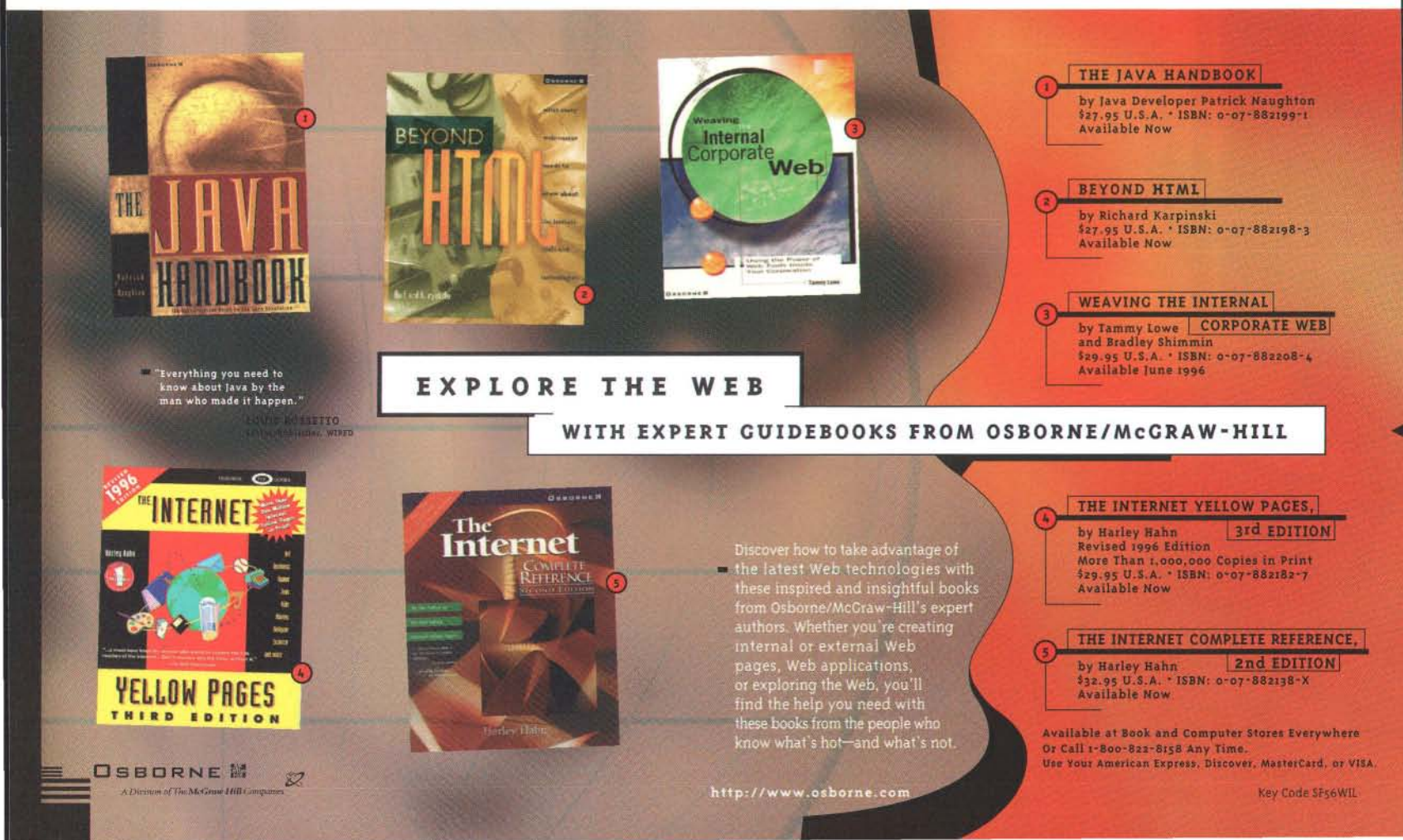
To come up with subject categories, Architext makes only one assumption: words that frequently occur together are somehow related. As the corpus changes – as new connections emerge between, say, O. J. Simpson and murder – the classification scheme automatically adjusts. The subject categories reflect the text itself – not the worldview of a few computer scientists in Mountain View, or of a 19th-century Puritan named Melvil Dewey.

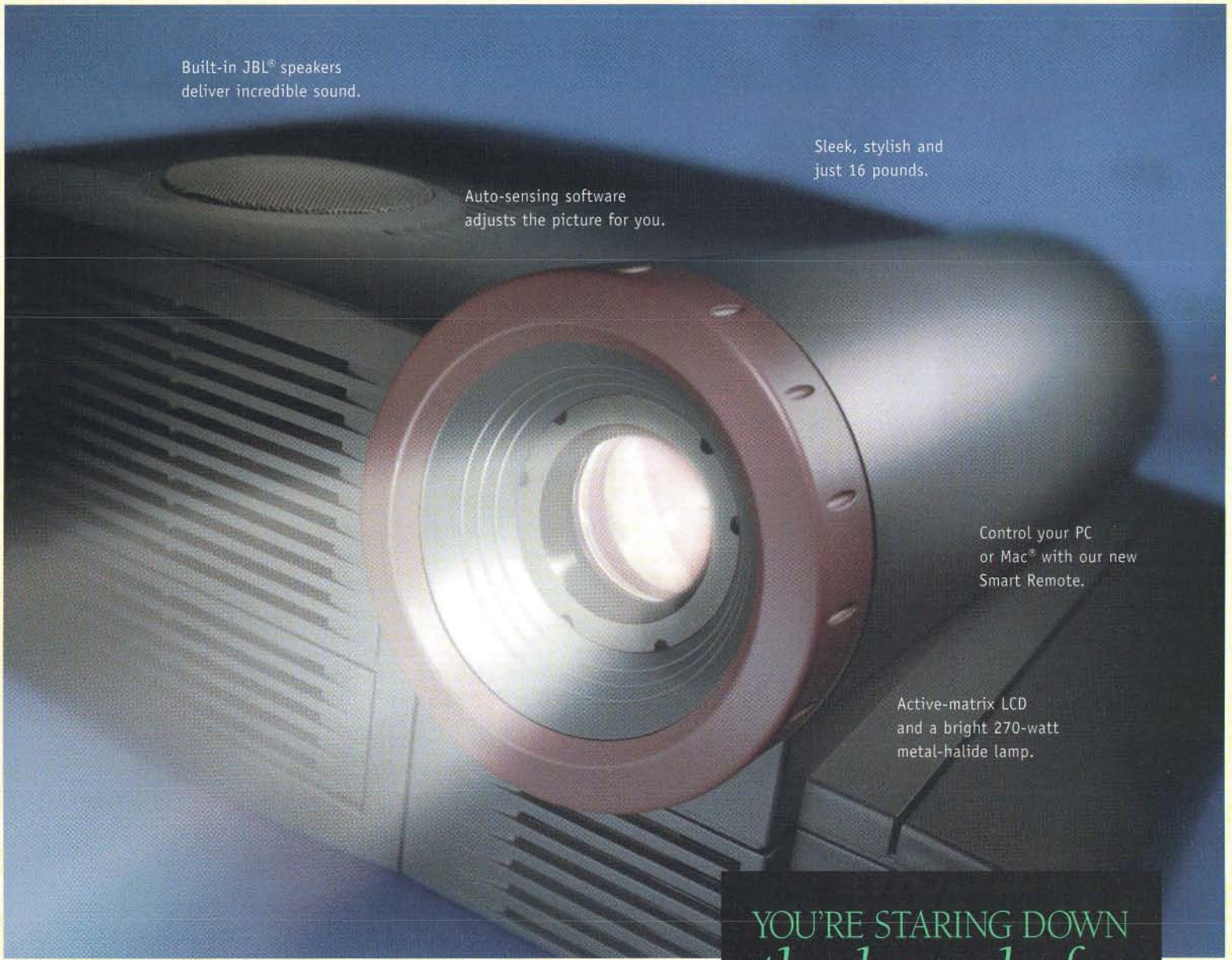
But the proof, of course, is in how well it actually works. Although evaluating a search engine empirically is nearly impossible (since checking if it found every relevant Web page would require that someone also search the Web by hand), anecdotal evidence in support of Excite is fairly strong. I've tried doing identical searches on Inktomi, Lycos, and Excite, and found that Excite returned the most relevant documents. Which isn't to say that Excite is perfect: it still returned a fair number of superfluous documents that left me scratching my head, trying to figure out the possible connection. This isn't too surprising, since some words may frequently occur together even if they aren't really related – thereby throwing off Excite's statistical algorithms. Nonetheless, what bothered me most about Excite is not how it searches, but what it searches.

Excite doesn't just index the Web – it also indexes every message posted to about 10,000 Usenet newsgroups. That sounds harmless – after all, Usenet is a completely public message board that anyone can read. Yet searching Usenet with Excite, or similar services such as DejaNews *(www.dejanews.com/)* and Alta Vista, can feel surprisingly invasive. It's possible, for example, to search on a person's name and find every message they have posted – whether it's on comp.client-server or rec.arts.erotica. Using these tools, anyone can build a profile of a person's interests, based on where they post.

Spencer became animated when I asked him about the privacy issue, finally looking at me instead of the floor as he launched into a topic he had obviously thought about. "I think that indexing Usenet is OK because it is a completely public forum, but other things do make me uncomfortable." For example, Web indexes often end up indexing the archives of Internet mailing lists. "There is a process of joining a mailing list, so it does seem kind of private." Nonetheless, Architext has plans to take indexing even further. "One thing we want to do is index IRC (Internet Relay Chat)," said Spencer. "It will let you find people who are talking about things you are interested in right then." It will also let anyone play at being Big Brother.

Systems like Excite make it clear that as indexing becomes more prevalent, we're going to have to develop new notions of what it means for a document to be 180 ►

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# Indexing the Web

◂ 178 public and what a reasonable expectation of privacy entails. As Reva Basch (see "Super Searcher," *Wired* 3.05, page 152), a professional online searcher, says, "We can no longer depend on privacy through obscurity." With a full-text index, every word can be found, tracked, and correlated.

Privacy aside, Architext's Excite makes a significant step toward building a universal library. By using concepts instead of keywords, information is forced into an organized structure instead of being left as a jumble of words. But Excite still has a couple of technical shortcomings: its fairly simple statistical technique of automatic classification is prone to error, and it still doesn't provide the context a system like Yahoo! does.

## Oracle's software: a hopeless pipe dream – or the mother of all search engines?

I found the pieces I was looking for at Oracle Corp.'s sprawling campus in Redwood Shores. I had been hearing rumors for a while about the product they were developing, but it seemed like no one in the close-knit Web indexing community really knew how it worked. What little I had heard was contradictory: Oracle's software was a hopeless pipe dream, a byzantine attempt at artificial intelligence that would never work – or it was the mother of all search engines.

To clear things up, I met with the man in charge of the project at Oracle, Kelly Wical. Walking up to the giant black-glass building, then entering the echoing lobby to page Wical from the glass and marble security desk, I felt as if I had suddenly entered the big leagues. Unsurprisingly, Wical turned out to be far older than the developers I had met with so far.

Genial and rotund, Wical isn't some computer scientist fresh out of college: he's been working for the last 20 years on a system to help computers understand English. His goal is a program that can not only analyze a sentence and figure out information such as what the important nouns are and how they are being modified, but actually understand the written word from the reader's point of view.

His quest began while at a computer company in Houston, where he worked on a program to aid users searching for information on specific topics in gigantic online manuals. Then, in 1988 he founded Artificial Linguistics Inc. and continued to attack the problem of understanding written English, producing a sophisticated grammar checker as a spin-off of core technology. In 1991, ALI was purchased by Oracle, and Wical was brought on board to continue development of his system, under the name ConText.

None of which may sound terribly relevant to building a universal library. Except that ConText's ability to understand English comes both from its knowledge of grammar and from its incredibly detailed hierarchy of concepts. ConText knows, for example, that Paris is a city in France, which is a country in Europe. This combination of knowledge is exactly what Excite lacks (and what causes its automatic classification algorithm to sometimes make glaring errors).

The problem is that creating such a comprehensive knowledge base seems impossible. OK, I said, even assuming that this linguistic engine can parse English sentences (something scientists have been struggling with for years), the process of creating a taxonomy of concepts, not just major subjects, would require an unprecedented amount of effort.

Wical smugly agreed. Already, more than 100 person-years have been spent building ConText's database of knowledge. To do so, Oracle has employed dozens of "lexicographers," a lofty title for what are often college interns who do the necessary legwork. "We've sent people to grocery stores, to scientific conferences, even sex shops," said Wical, with a touch of amazement at the resources Oracle can marshal. There, the lexicographers identify the subfields of metallurgy, for example, or the types of pornography, and then incorporate the results into ConText's ontology. This data is supplemented with automatic statistical techniques, similar to those used by Excite, that analyze huge collections of documents for unique concepts and relations between them.

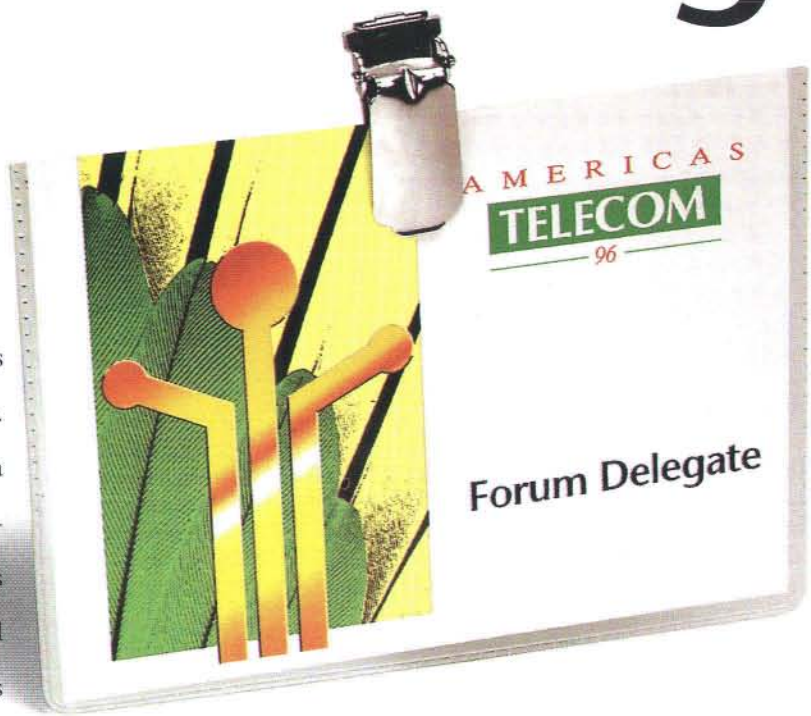
The result of all this effort is a nine-level hierarchy – with each level offering increased specificity – that currently identifies a quarter-million different concepts in English. The scheme also includes approximately 10 million cross-references between related concepts, such as Paris and France, roadways and death. ConText uses this data when it automatically analyzes a document and then decides which of the concepts best describe the document's topic.

That's the theory, anyway. I wanted to see how ConText works in practice, so Wical watched over my shoulder while I tried out the text-analysis engine on a few articles I had brought along. It wasn't exactly a rigorous evaluation, and we turned out to be using an old version of the software, but it gave me a feel for what the program can do. Some of ConText's features – like its summarize tool, which takes a document and tries to compress it down to just the important parts – turned out to be pretty unimpressive. But when it came to document classification, ConText was unerring.

An article I wrote about hive computing, for example, was correctly classified under Science and Technology:Hard Sciences: Computer Industry:Supercomputing, Science and Technology:Hard Sciences:Computer Industry:Workstations, and Business and Economics:Economics. An excerpt from *Takedown*, a book by Tsutomu Shimomura and John Markoff about notorious hacker Kevin Mitnick, was classified under Science and Technology:Hard Sciences: Computer Industry:Cyberculture:Hackers.

The only time ConText really failed at classification was when we tried it on a piece of fiction. Wical happened to have a chapter of Tolkien's *The Hobbit* on his hard drive, and it came back classified under Geography and Mythology. Neither of which seemed to me the real topic of the book. I half jokingly took Wical to task for this, and he shrugged. "What's in *The* 182 ▸

# Why Our Delegates Don't Delegate

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# Indexing the Web

◄ 180 *Hobbit* isn't what it's about."

An obvious enough point, but it underscores an important truth about information retrieval. No matter how good the technology, it can only work when the meaning of a document is directly correlated to the words it contains. Fiction – or anything that relies on metaphor or allegory, that evokes instead of tells – can't be usefully classified or indexed. Its meaning comes from the reader. That's a significant limitation for any attempt to automatically organize the Web.

In his system's defense, Wical was quick to point out that automated tools for organizing fiction are no worse than the current, simplistic manual techniques. True. But that's missing the point. As automated indexing becomes available, we will begin to depend on it. It will encourage people to write plainly, without metaphors or double entendres that might confuse a search engine. After all, everyone wants people to be able to find what they have written.

Despite this concern, I drove away from Oracle's gleaming headquarters convinced that a useful and complete organization of the Web was possible. The Web no longer seemed too large, and computers no longer seemed too dumb. I imagined a system that combined the scalable hive computing of Inktomi, the self-organized classification of Excite, and the raw knowledge of ConText. But I was starting to question what the real point of indexing the Web was. I always had some vague notion of a universal library advancing science, informing voters, saving the world – who knows? The feeling of omniscience that came from searching gigantic databases like Lexis-Nexis seemed reason enough. But something Kelly Wical had said made me start wondering.

**What's the purpose?**

The issue came up when I asked Wical what could have possibly kept him interested and motivated to work on the same project – the quest to understand English – for the last 20 years. At first, he just made some vague noises about how it was an "interesting problem with a lot of practical application." But, wanting to hear something that jibed with my own reasons, I kept probing. Finally, he leaned back and said, "My personal reason? Well, I want to talk to hobbits."

Wical slowly began to talk about his fascination with *The Lord of the Rings* and his dream to bring Tolkien's books to life by writing a computer program that understands everything in the fantastical trilogy – that knows Gandalf is a wizard, that knows mithril is the most precious metal in Middle-earth, that knows the Elven family tree. Once the books have been made digital, Wical said, they could be interactive. The plot could be altered, magic powers could be adjusted, new characters could be added. Wical could enter the story.

**"Information retrieval is not about finding how much tannin there is in an apple."**

I found this reply so odd and unexpected that it made me wonder if my motives for wanting to organize knowledge might appear equally strange.

I decided to watch how people use existing search engines to understand their popularity. But after a boring half hour at UC Berkeley watching the queries as they came into Inktomi, I still didn't have an answer.

True, just looking at the most common search terms pointed to an obvious driving force: sex. The top 10 search terms sent to Inktomi were "sex," "nude," "pictures," "adult," "women," "software," "erotic," "erotica," "gay," and "naked." But percentagewise, these terms made up less than a quarter of all queries. Other search terms ranged all over the map, from people's names to "wood-burning stove" to "nine-inch nails."

So I went to see Brewster Kahle. The founder of Wide Area Information Servers Inc., Kahle is one of the handful of people who have managed to actually get rich from information retrieval. With his huge, bushy hair and exaggerated hyperkineticism, he looked like a clown after too much coffee. But no one knows more about the intersection of the Internet and knowledge organization.

"Information retrieval is not about finding how much tannin there is in an apple," he declared in his San Francisco office. "It's about letting everyone publish." With that, he was off on a long rant about how organizing the Web matters, because, as Architext's Spencer had told me, "it's about people finding people, not people finding information." Indexing the Web allows the 40 people interested in Bulgarian folksinging to find each other, it allows fans of long-forgotten TV shows to get together and reminisce. It creates communities.

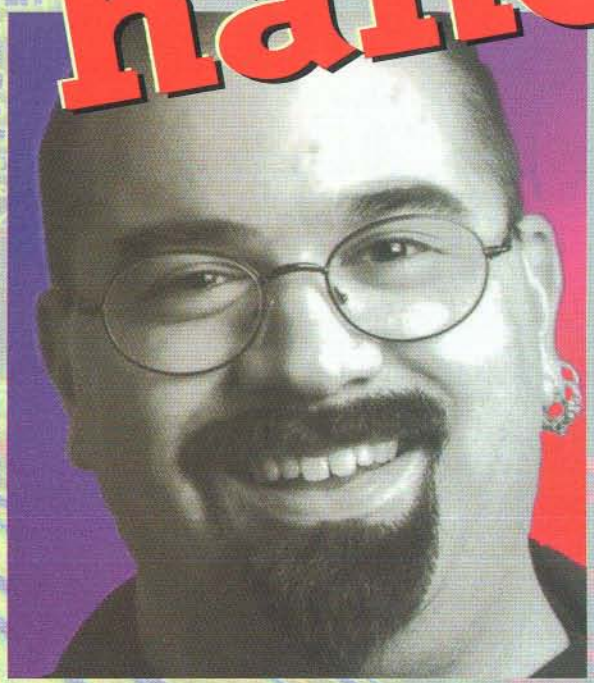
Even with Kahle's dramatic gesticulations, the argument didn't seem very convincing. The desire to form clubs seems to stop with the Kiwanis set. Then Kahle started speaking at a fever pitch, with one foot on the table and arms oscillating wildly:

"I grew up watching just a whole lot of TV, signals coming right at me. Then, at school, teachers would just tell me stuff, and I'd just try to remember it. But, when I finally hit graduate school, the teachers would say, 'Here's what's known, here's what isn't. If you make any progress ... here's my home number!' Finally, I had a chance to contribute!"

Now this was something I could relate to! Now I understood why indexes mattered. It was like Jerry Yang of Yahoo! had said: "If the Web was a broadcast medium, then we could just do something like *TV Guide*." But once anyone can publish, anyone can contribute, some new kind of organization is needed.

Knowledge organization is important not because of how much knowledge there is now, but because of how many people are becoming involved in its production. Web indexes now play the same role that atlases did in the 16th century. Both hold an appeal that goes far beyond any possible usefulness. Both lead to dreams of exploring new territories, of discovering new opportunities. Both are evocative because of what they leave blank. ■ ■ ■

# "I wanna hold your hand!"



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# Alzheimer's

◄ 119 who'd just earned a doctorate in sociology from Case Western Reserve University, she was just starting to understand the potential of microprocessors and how people could use them. In her previous work in data management and analysis, she had dealt primarily with mainframes.

But in her new job at the center as director of research operations, she was supposed to think of innovative ways to provide community support to people affected by the disease. Coincidentally, Thomas Grundner, a colleague she'd met while working on her PhD, had recently become so interested in hooking up community users to the Internet that he'd created a new kind of access provider. Through his service, anyone with a modem could connect without membership fees or user charges to the limitless resources of the Internet.

Alzheimer's centers, including the University Hospitals project, Smyth gathered enough funding to launch the project.

In 1989, when the first users were trained, Smyth thought the bulk of their activity would center on posting medical questions for the hospital's professional staff to answer. She was wrong. From Day One, the caregivers were dialing in to talk to *each other*, craving communication so persistently that they would endure two hours of busy signals waiting for a Free-Net phone line to open.

"They were most interested in the peer-to-peer communication," Smyth says. "They had this push to get together. We didn't expect their range of conversations, the topics, the fact that they talked about things that are a part of their lives. Weddings. Funerals. Gardens. They taught us that they were real people – not just caregivers. They refused to be compartmentalized."

**The caregivers were craving communication so persistently they'd endure two hours of busy signals waiting to log on.**

Grundner called the service the Cleveland Free-Net.

One day, Grundner told Smyth the results of his earliest survey charting the types of people who were logging on.

"It was older people and, well, that was astounding to me," Smyth recalls. "We actually saw these normal people using a computer system."

That's when Smyth got her idea. She asked Grundner if she could design an experimental project to put Alzheimer's caregivers – typically older people with little computer experience – online. Using the generic features available on the Free-Net – email, the Q&A function, the BBS structure – Smyth created an environment where caregivers could get expert medical advice, find out the latest news about Alzheimer's research, and converse with each other. And with a small grant from the National Institutes of Health, which already was underwriting the creation of a number of regional

At home in her ranch house during the summer of 1992, Sally Chadima found herself getting caught up in the stories of the other caregivers – of how Linus walked Ruth around the nursing home grounds to see the flowers, amazed that his wife could mock the cardinals' whistles; of how Audrey took a daylong bus tour with a friend.

One day in August, Sally logged onto the system, and read:

> **Article #124**
> **From: cb165@cleveland.freenet.edu (Linus A Gottas)**
> **Subject: Wear a Helmet**

This afternoon I was riding my bike in Met Park and I wiped out.... Went to emergency room.... X-rays. A little later a doctor came in and said, "Buddy, you have a fractured clavicle, how do you feel?" Gosh, I didn't even know I had a clavicle. From the hospital, I went to NH to visit Ruth – it was already an hour later than when I usually visit. She had her tray but was not eating – she was very agitated and chewing everyone out who came near her, including me. Finally got her to quiet down a bit and got her to drink 8 oz milk. Refused anything else, spit the chicken out at me. Finally got her to taste her fruit cocktail and she settled down ... she began to smile and greet people w/ Hi Honey. Left at 8 PM and she was in a good, pleasant mood.... And so another chapter in the Lives of Ruth and Linus.

> **Article #127**
> **From: b1728@cleveland.freenet.edu (Sally Chadima)**
> **Subject: Wear a Helmet**

Linus: Too bad the swelling in my jaw went down after my visit to the dentist. We could have met for lunch somewhere, you with your shoulder and me with ice packs on my golf-size swollen jaw.... Linus, do you go and see Ruth every day? I am just wondering whether it would be good for me to see Ed every day or not – just a thought as the time is approaching.

Orders from all of us – be careful on that bike.
Sally Chadima

By 1992, dozens of caregivers were online – and getting increasingly frustrated by frequent busy signals when they tried to log onto the Free-Net's few community access lines. Smyth realized that the project needed its own dedicated phone lines, and when it was time to renew a small grant, she asked for funds to solve the problem. Today, the caregivers can call in on six lines that are ID-protected.

Held together by a patchwork of small grants over the years, the project's annual budget has never topped US$100,000. Current funding comes from a three-year, $153,000 grant from The Cleveland Foundation, a local nonprofit group. Mainly, the money pays for new Wyse computers.

The caregivers' machines are essentially dumb terminals without hard drives and are good for only one thing – connecting remotely to a complex system such as the Free-Net. The Wyse terminals are, for instance, the kinds of machines hospital personnel use to link to vast archives of patient records.

Sue Kacerek trains new users, coaxes reluctant computer neophytes to jump any psychological hurdles that prevent them from posting that first message, and troubleshoots when they have 186 ►

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# Alzheimer's

◄ 184 technical difficulties.

The typical user is a 52-year-old woman who cares for an ailing parent at home, Kacerek says. So far, more than 200 caregivers have been trained. Most of them still have their terminals.

Normally, Kacerek will load a Wyse terminal, keyboard, and modem into a box, connected and ready to run. After completing the hour-and-a-half training session, all a new user has to do is carry the box into the house and plug two power cords and a phone line into the wall.

"Usually, training starts with me saying, 'This is the space bar.' And sometimes, I write S-P-A-C-E on it, in marker. I try to use language they understand. I'll say, 'See that number you typed? To make it go, you press this key, and it's called Enter.'"

Kacerek says many users get excited by the possibilities right away. That was Marian Wright's reaction, for instance, when Kacerek took a computer last summer to the white frame house on Cleveland's west side, where Wright has lived for 35 years. The 53-year-old former security guard supervisor had been caring for two Alzheimer's patients – her mother and a longtime family friend named Don. With nerve damage in her right foot, she didn't get out of the house much anymore.

So as soon as the computer was set up in a corner of the dining room, near the glass-fronted curio cabinet filled with Hummel figurines, "I felt better," Wright says.

Within hours, her fingers were flying over the keyboard and she had learned to make "smiles" and to sign off her own posts: "Love Marian :-)"

"Sometimes when I can't sleep, I come in here and write it all out," she says, gesturing around the room decorated with a lace-covered tablecloth and a set of The Three Stooges commemorative plates. "Once, I put down everything about a hard day's night, where I was up all day and all night with them. They sit in two chairs and he can pick and pick at Mom. I have to be the referee."

The computer is an odd piece of equipment to find in Wright's house, where a rotary-dial phone is still mounted on the wall by the front door, and a vintage tape deck as big as a night table sits nearby, its clunky metal knobs reflecting the weak sun of a winter afternoon.

Even caregivers who are computer-literate before they join the Alzheimer's online project say they are amazed by its power to improve their lives.

Mike Braun got his first computer, a RadioShack TRS-80 Model 1 with 4 Kbytes of RAM, back in 1980, long before his wife, Sheila, was diagnosed with Pick's disease, a fatal ailment rarer than Alzheimer's that causes similar symptoms of dementia. He got online, on his own, during the 1980s.

"Driving home from the hospital, the night the doctor told me in 1993 that my wife had Pick's disease, I didn't know diddly-squat about the disease and I needed information fast," he remembers. "So when I got home, I just started nosing around on the Free-Net. I figured ... there had to be something. And lo and behold, I came across the Alzheimer's caregivers forum."

One of the first messages Braun read, sitting before his computer in his glass-walled contemporary house on top of a hill in Chagrin Falls, Ohio, was from a woman who had just returned from the nursing home, where her husband had died that day.

"It was timestamped 3:45 a.m., and the gist of it was that she felt it was necessary to talk to her computer family before she called anybody else," Braun remembers. "I was so impressed with this lady's feelings toward the other caregivers that I knew immediately this was something I was going to have to be involved with."

In fact, after he read archived posts from caregivers who were agonizing over whether it was time to move their own sick family members out of their homes, Braun decided last year it was time to place his wife in a nursing home.

"It helped me," Braun says. "Just reading what they had gone through helped me a lot."

Reading about the other caregivers' lives was helping Sally Chadima a lot in the summer of 1992. She logged on almost every day and started to think of the caregivers as some of her closest friends; some of them even began meeting for lunch – once a month on the west side of Cleveland and once a month on the east side, so that nobody had to drive too far – a ritual that endures to this day. She read about how Linus so missed the lemon pies Ruth used to make for his birthday that he had gone to the supermarket and bought a box of lemon pudding. She read about how the hard work of painting and stenciling the walls of her house was good therapy for Audrey.

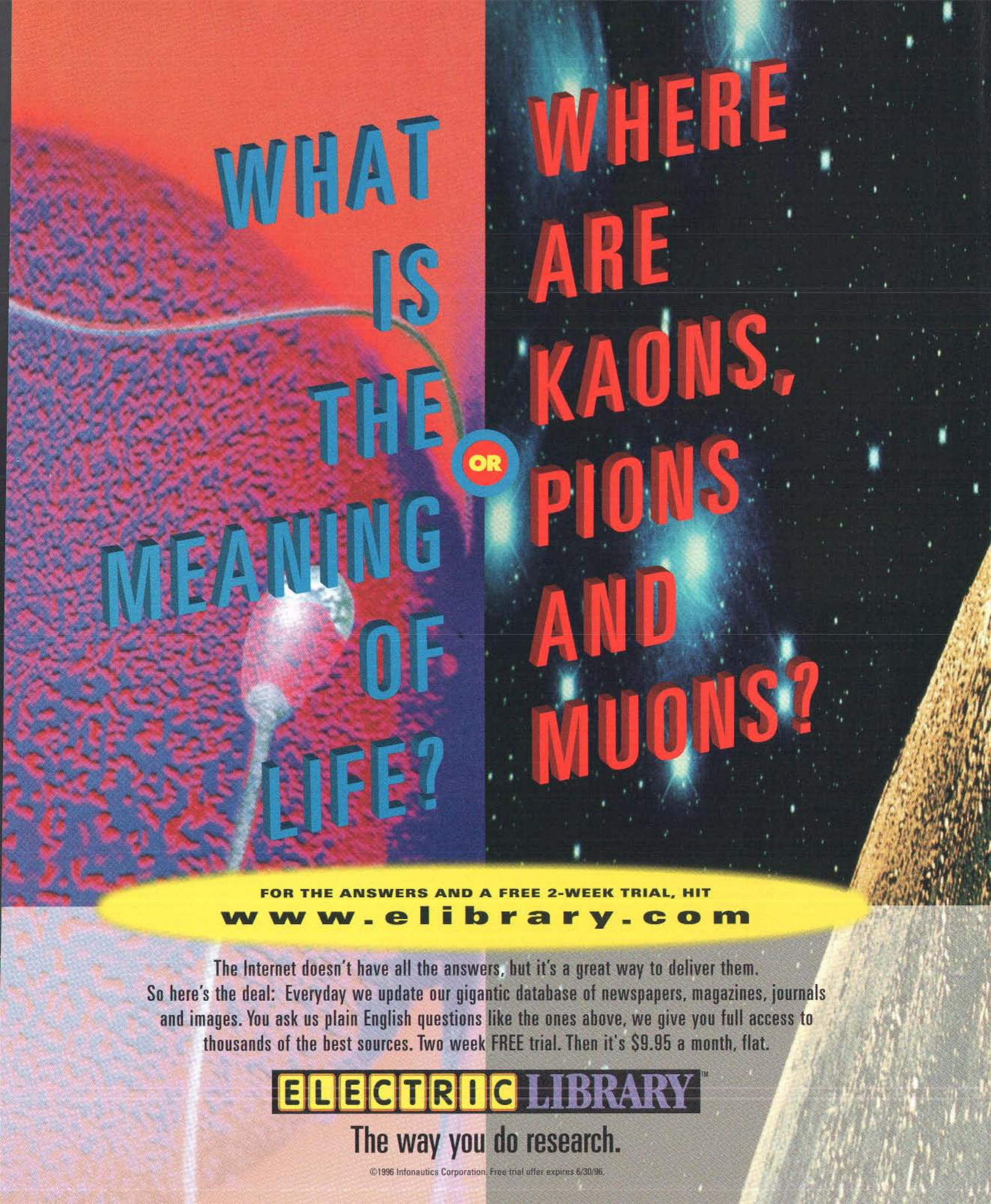
**"Usually, training starts with me saying, 'This is the space bar.' And sometimes I write on it, S-P-A-C-E, in marker."**

Then, for a few days in August, Sally didn't log on at all.

Finally, one day, she wrote:

> **Article #175**
> **From: b1728@cleveland.freenet.edu (Sally Chadima)**
> **Subject: Anybody home?**

Yesterday I LOST 2000 LBS, BECAUSE A TON FELL OFF MY SHOULDERS when I finally placed Ed in a nursing facility after he had threatened several times to kill me and even asked me not to put knives or forks on the table at dinner time because he was afraid he might hurt me in one of his "unlucid" moments. OF COURSE, the guilt feelings are there because it is so new, but there was absolutely no alternative, and my entire family agreed.... I COULD NO LONGER MANAGE ON 2 hours of sleep per night. Last night I made a VERY strong martini, watched the evening news, and got the first uninterrupted night's sleep in over a year.... Even the cats are more relaxed now. They got scared as anything when Ed would throw things around. I am glad I have them for company. Thanks to ALL of you for caring and I will be keeping in touch to keep you all abreast of things. LOVE TO ALL :-) SALLY CHADIMA 188 ►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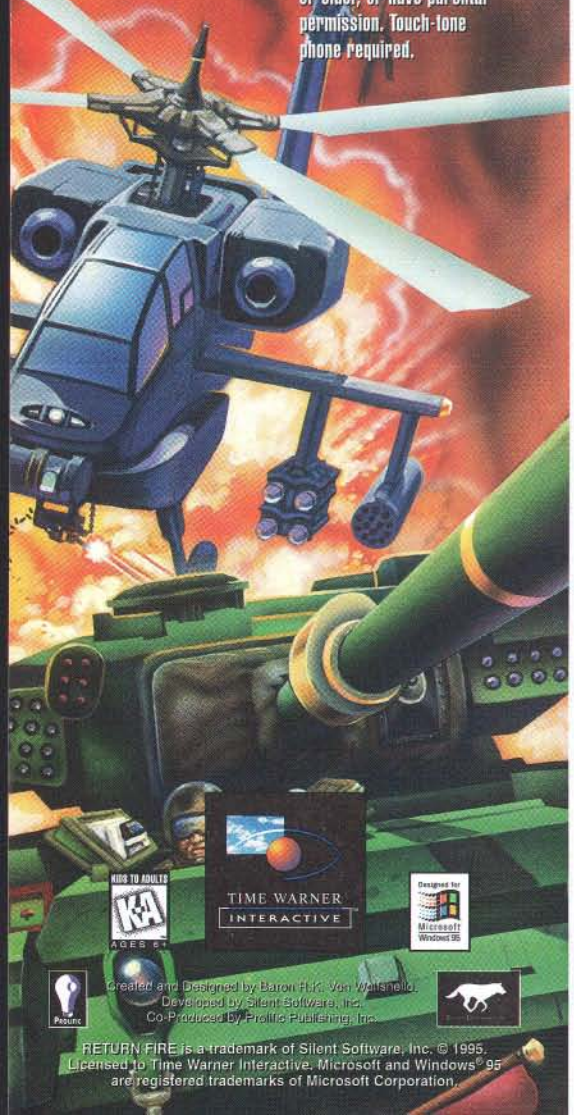

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# Alzheimer's

**◄ 186 > Article #176**

**From: cb169@cleveland.freenet.edu (Audrey Buntura)**

**Subject: Re: Anybody home?**

Hi Sally – My heart goes out to you, you brave soul. I know it was a very hard thing for you to do to put Ed in the nursing home, but there are times in our lives when we must do things that we dread…. Once you get acquainted with the nurses and employees there, it will give you a different feeling…. At first they called me Mrs. Buntura all the time. Now after hearing Frank calling me all the time, they all call me Audrey and in a way it is like going and visiting friends…. Prayers from all of us out here. We're all behind you, and know that you (and Ed) will do just fine. Don't forget - :-) :-) Audrey

**> Article #180**

**From: cb165@cleveland.freenet.edu (Linus A Gottas)**

**Subject: A DIFFICULT DECISION MADE**

SALLY, A GREAT BIG HUG TO YOU!… You have a great love for Ed. He has a great love for you. His love for you is locked inside him now and at times he doesn't know the "combination" to let it show. I (we on this network too) are proud of you Sally. We too love you and have been "sweating" this out w/you….I have a busy day ahead of me. Have to pick up Raggs, our dog, from the kennel now, visit Ruth, get some groceries in, do some banking, etc. But before starting the day, had to "get on the screen" to offer you my support in what you are feeling. Linus :-) :-) :-)

**It was less than two months later that Ed Chadima died. His health declined steadily in the nursing home, until one day, Sally wrote, "At 5 a.m. this morning Ed died in the emergency room of Parma Hospital…. You are the first people I am notifying."**

**Sally got dozens of messages of condolence. She said the caregivers had started to feel like family.**

**Sally kept her computer for a few more months, then one day decided she was through with Alzheimer's, once and for all. She felt as if she'd had a toothache for years, and suddenly it was gone.**

**The other caregivers urged her to stay online to share the benefits of her experiences with others. But one day, quietly, she told Sue Kacerek that she was ready to give back the Wyse terminal.**

**"After Ed's death, I felt like I had done my grieving, starting two or three years earlier, when he started to get so bad," she remembers. "It was time for me to move on."**

**She still keeps in touch with some of the caregivers – Linus got a birthday card from her last year – and she says she doesn't know how she would have made it through such a difficult time without them. But, she says, "It was time to get back to my life."**

**Audrey, on the other hand, has stayed on the network. When her husband, Frank, died in 1994, the word spread online within hours. At the funeral home, she looked up – "I saw all the people from the computer group come in the back," she remembers. "I thought, There's my family."**

**She kept her Wyse terminal and now converses daily with other caregivers who are navigating the same rocky terrain she remembers. "If I can help, that's a good reason to stay," Audrey says.**

**Linus, too, has stayed online. When his wife, Ruth, died in 1995, he didn't even consider giving up his computer. As he said one winter night, while maneuvering his van through 14 inches of fresh snow on his way to pick up Audrey for dinner at the Vienna – the 24-hour restaurant where the caregivers hold their monthly luncheons – "I had an opportunity to show my love for Ruth in a way many never do. In a way, I'm grateful for that." Both Linus and Audrey are support-group leaders for Alzheimer's caregivers. And he checks his email a couple of times a day. ■ ■ ■**

## Sally wrote: "At 5 a.m. this morning Ed died…. You are the first people I'm notifying."

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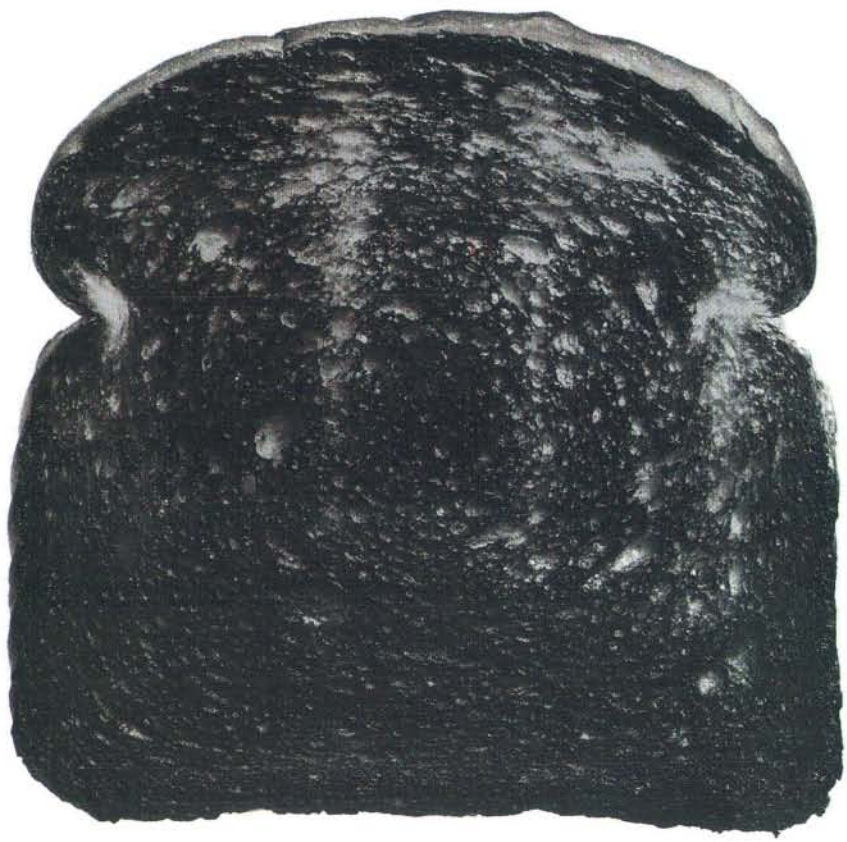

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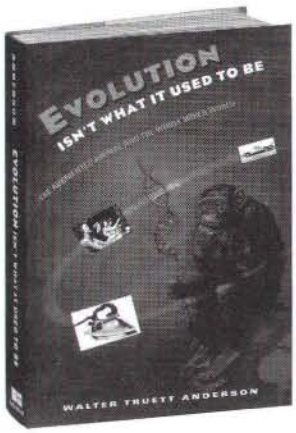


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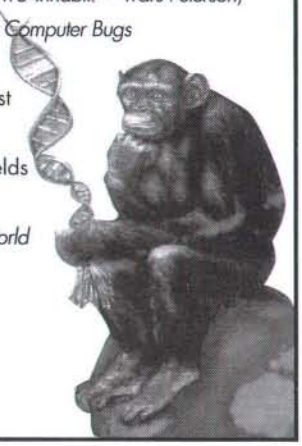

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# Gassée

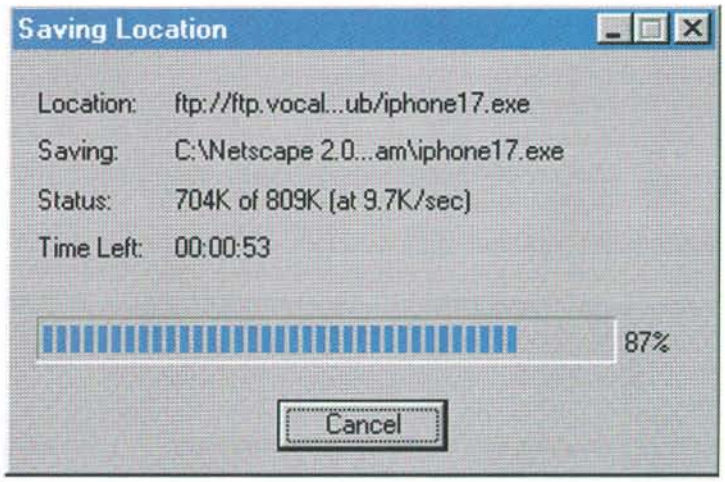
◄ 125 tion. If you align yourself with the ball-breaker, high-testosterone crowd, that leads to innovation."

Gassée sees his company as part of a tradition of putting out a device and then letting the market emerge. "Jobs and Raskin brought out Apple II without any vision of VisiCalc, the application that would take their product out of the hobbyist ghetto and into the business market. The IBM PC: Don Esteridge developed it in Boca Raton and had no idea that transcendental meditation teacher and disc jockey Mitch Kapor would create Lotus and make IBM big time in the business market. Jobs and Raskin, when they started Mac, had no idea that Canon, Adobe, and Aldus would create the desktop publishing revolution, which brought Mac into the big time. The guys who developed Amigas had no idea the Video Toaster would bring them into video editing, multimedia, and the music market.

"Many things we've done in our company we are doing by studying Amiga," he adds. "That company sold 4 ½ million units and at one point had $800 million in annual revenues." Gassée goes so far as to say his product is a "spiritual descendant" of Amiga. Waiting for the killer app? I ask. He prefers another metaphor – the tractor app, which is not only more peaceful but more applicable, in that it "pulls your application into the big time."

Then the man who is credited with bringing the Macintosh to Europe spots the fuzz parked along the shoulder up ahead, near the sign indicating Interstate 80. "*Monsieur, je pensais que quatre-vingt c'était la limite de vitesse!*" he jokes as we plot a strategy in case we get stopped for speeding. Our little conspiracy: Gassée will play the part of the French-speaking tourist who thinks the Interstate 80 sign means the speed limit is, in fact, *quatre-vingt*. I will be a not-too-bright, hearing-impaired passenger.

It is something about his lapsing into French that seems to jump-start Gassée out of PR-speak and into saying outrageous things. Like: "The Japanese, they are a lot more trustworthy than people say. People say they are inscrutable – that is bullshit! The Japanese have a sense of style and aesthetics that I envy." Or: "When I want to do something mindless to relax, I reinstall Windows 95." Or, regarding Neo-Luddite 192 ►

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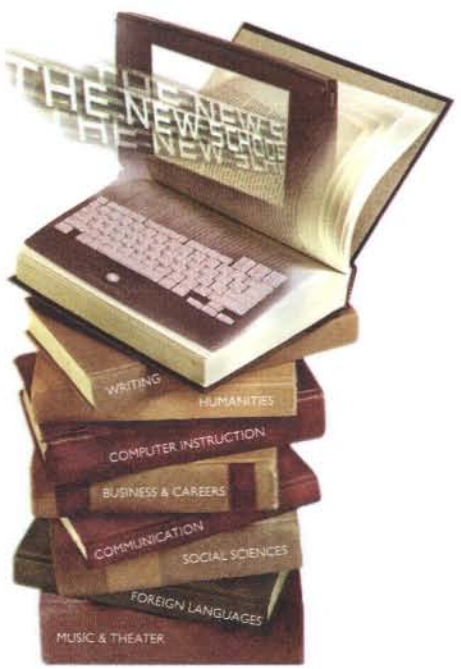


# Gassée

◂ 190 Clifford *(Silicon Snake Oil)* Stoll: "It's good. By saying computers are bad he gets people talking about computers, which sells computers." Then, when he discovers a new way of describing his company – as "the Pete's Wicked Ale of computer companies" – he shares his delight: "My nipples harden!"

The guy's a salesman. He's less a creative technical genius than the requisite personality-behind-the-project. The son of an accountant, he got his start in the 16th arrondissement. He attended a Roman Catholic boarding school in Brittany, where he hated soccer but loved building clandestine radios and hiding the antennae in baseboards. He saw his first OC71 transistor in 1955; this was the kind of adolescent you could imagine getting caught reading *Électronique Populaire* hidden inside *Playboy*, although he makes it clear that he wasn't your typical undersexed nerd. "I don't understand the demonization of sex in this country!" he exclaims. "I don't understand how we can show on TV people blowing each other's brains out but we can't show them blowing each other's...." (Only two things from our trip are off the record: the end of the preceding sentence and the speed at which he drove the car on a Nevada back road.)

Gassée wanted to be a mathematician and was studying for his advanced degree when finances forced him to become a bartender and a maître d'. Then he advanced up the selling hierarchy from insurance to royal jelly to calculators to pharmaceuticals to computers. "I was a young adult and didn't know what I was about," he recalls. But having tended bar in Deauville and having sold royal jelly door-to-door, it was hard to imagine life as a mathematics researcher. Gassée never did return to his studies. In 1968, Hewlett-Packard hired the 24-year-old to peddle the company's first desktop model, the 9100A, thus putting an official end to Gassée's psychosocial moratorium.

"To me, it was my business school," says Gassée of his six years at Hewlett-Packard. The young man was given increasing responsibilities. He wrote press releases, he held press conferences. "I got lucky, because how many companies would give a 24-year-old without experience that opportunity." Eventually, he was promoted to sales manager for the company's European head- 194 ▸

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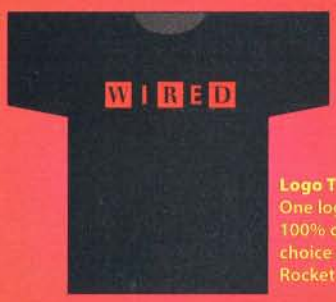


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# Gassée

◄ 192 quarters, and he still has warm feelings for H-P and its founders. "Bill Hewlett and Dave Packard are models of virtue who have aged well and continue to do well."

From H-P, Gassée moved to Data General, where he started out as president of the French affiliate and was responsible for Europe and the Middle East when he left five years later. "Data General was rough," he says. "At H-P, everyone was nice and trustworthy. At Data General, it was dog eat dog, but a nice balance after H-P." Next he went to Exxon Office Systems ("or Orifice Systems"), where he was president of the French division. "I got taken in by business writers who were writing about Exxon's diversity, the vision, the infinite money. It was horrible. It was fucked up. I got burned." Eighteen months later, his friend, analyst Aharon Orlansky of Warburg Paribas Becker Inc. – for whom he would critique press releases – turned Gassée on to the fact that Apple was looking for someone to start its division in France. In those days, Apple was selling the Apple II and III, the Lisa, and, eventually, the Mac; under Gassée's direction, France became the company's most successful market outside the United States. Gassée was rewarded for that success in 1985, when John Sculley imported him to Cupertino, less than a month before the messy ouster of Steve Jobs. Gassée was being touted in the press as Sculley's heir apparent, and for a while there, he was a god – in some circles.

Gassée recalls that there was a major cultural conflict with which to contend. "I came from France – I spoke my mind. It's a more abrasive culture. I saw the Apple IIGS and said, 'This is fucked!' and it did not amuse some people. In France that's an opening statement. In retrospect, I blush when I think of all the stupid things I said."

Companies will accommodate cultural diversity as long as the profits roll in, but then Apple – and the Macintosh Portable, Gassée's baby – started foundering. By the time he left in 1990, his responsibilities had been cut in half. They had even taken to calling him Jean-Louis Passé. Gassée recounts, "I had the 'seminal' dinner conversation at Maddalena's when John Sculley asked me what I thought of him, and I answered honestly. After the dinner, the vice president of human resources at Apple, Kevin Sullivan, put his arm around my shoulder and told me he was proud of me. Right there and then, I understood I'd done something irreparable – luckily so." Shortly before resigning, Gassée says he told Sculley to cancel the going-nowhere joint project with IBM, Taligent (the "Pink" operating system), and blame it on him. "He didn't cancel it – he probably thought I had some ulterior motive," says Gassée. Sculley? "I owe him a lot."

It is sunrise in the Sierras and the morning fog creates a magnificent cotton-candy effect over Donner Lake. The photographer wakes up as we pull into Truckee for breakfast. Gassée talks cameras and movies and how the BeBox won't need "positioning," which is phony, and how the Marlboro Man is a pure example of product positioning.

**"What happens after you saturate the geek market?" a financier asks. Says the cocky Frenchman: "Sell them another computer!"**

"It is a metonymical link between subject and object. The Marlboro Man connects our desires for the outdoors to the cigarette, because cigarettes themselves are undifferentiated."

"The important thing is that they started with a clean slate," says developer John Worthington, whom I phoned after the Black Rock trip to get an outsider's inside opinion on the BeBox. Worthington is the co-founder of San Jose, California-based MojoSoft Ltd., which is developing digital video and audio applications that will run on the BeBox – in addition to Mac and Windows versions. The result of BeBox's clean slate is an operating system that, Worthington says, "is much easier to program" than Mac or Windows.

Worthington feels there is a "silliness" to those older operating systems. "On the Mac, you are limited as far as file size. You can't have a file greater than two gigabytes, which is ridiculous because today you can buy a nine-gigabyte drive for $4,000. And with Windows, you still have a lot of DOS stuff beneath it. Even though they tried to spruce things up for Windows 95, they had to have compatibility with the old applications." He is parroting Gassée, who seems to be able to pull the metaphors out of his *cul*.

"I worked 22 years in the industry, and I noticed that operating systems get cancer with age," says Gassée. "With the incremental approach, they grow old and complicated and Byzantine with age. In 1980, Microsoft bought QDOS, which became DOS and is now Windows, Windows 95, Windows NT. When you have six levels of silt in the architecture, it's hard to move the foundation."

Gassée, who gave up "truly programming" in the early 1970s, boasts that "we wrote the operating system from the ground up," pointing out that when you have no baggage, you also have no legacy and "no applications to speak of."

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The inevitable comparison is made to NeXT and to Steve Jobs's computer-of-the-future that wound up being loved – much loved, in fact – only for its object-oriented software. "NeXT wanted to grow fast. They took a kernel from Carnegie Mellon and bolted it together with display PostScript. It was a slow machine, there was no floppy, and it was targeted at an insolvent market, the education market, which doesn't have any money," explains Gassée. "What remains from NeXT is wonderful programming tools. They are considered by many as having the best environment in the industry for corpo- 196►

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# Gassée

◄ 194 rations doing their own custom development for mission-critical applications. "There is a pause during which he looks out at a stunning display of Fremont cottonwoods nestled in a dusty valley reflecting at least 17 shades of brown. "We make our own brand of mistakes."

One way to distinguish him from Jobs, Gassée says, is that "I don't know the fuck if I'm going to hit or when." It is a jab at Jobs's bloated proclamations. Gassée, who tends to put a more comic spin on his pronouncements, is asked if he is friendly with Jobs. "It all depends on what you mean by 'friendly,'" he responds. Then, a moment later: "If we're on the record, he's a friend."

The coffee from Truckee must have started kicking in, because this is when Gassée's tense/cynical/delightful mind (described by John Dvorak as "the mind of a Frenchman which is unfortunately trapped inside the body of a Frenchman," a quote Gassée appends to his email) kicks into high gear.

**Gassée is selling more equity and reducing his stake, but he's philosophical: "Even if I have 51 percent of the *Titanic*, it's still a sinking ship."**

His strongest talent, it seems, is coming up with exquisite little barbs about other personalities-behind-the-project in Silicon Valley, a place that, despite a bull-run in technology stocks and a general mania over the Internet and multimedia, has become jaded and humorless – a point which Gassée disputes. "On occasion, Steve Jobs can be funny. Andy Grove has a great Central European humor…."

As we stop to refuel at a sun-bleached truck stop and transfer to a secondary road, Gassée's talent goes on parade. Scott McNealy: "He's got balls. He's got brains. They work nicely together." Larry Ellison: "I'd say the same of Larry Ellison, although they have different lifestyles. Scott is more private than Larry." Steve Wozniak: "He's teaching now. If he's making other people happy, that's fine."

Talk turns to cars, and Gassée reports that he recently ran into Wozniak in Los Gatos. The two drive the same model of Mercedes, although Woz's is beige and Gassée's is anthracite gray. Gassée mentions something about how he – unlike Ellison – never harbored a long-range desire to own a Testarossa. The picture he paints is one in which these guys cruise around Palo Alto and Los Gatos, where they all know the make, model, and color of each other's cars, and possibly the license plates, and they are aware of each other's every move and go around dissing one another – sort of like jealous Hollywood types. There was the time Steve Jobs drove the three or so blocks over from his house one Sunday morning at 9:30, unannounced, rang the Gassée doorbell, and invited J.-L. to a product announcement. He was lucky Gassée had his pants on.

The white Mercedes rolls down 67 miles of back road leading to the rusted near ghost town of Gerlach, home of two or three weathered saloon casinos. Gassée keeps looking at his watch as we follow my friend's vague instructions: on the other side of town, after the road becomes unpaved, keep going for about a mile and a half. Half an hour later, we haven't found the mud baths, although we can see the vapor rising from occasional hot springs dotting the open desert landscape. Oh, there is a weird art project of some sort, a faux cemetery with headposts bearing political sentiments that are presumably somebody's idea of a statement: "Attention all preachers: Have your fireproof suits ready at all times … David Koresh wake-up call." We make our way back to town and an almost-sober old-timer in one of the saloons indicates that the mud baths we're looking for were made inaccessible. He says we can sneak into the hot springs just outside of town, which are on private property, until somebody comes along and asks us to leave.

We drive through a gate, step out of the car, and come face-to-face with a garbage can overflowing with empty Bud bottles. The hot springs consist of a nasty-looking watering hole that has steam drifting skyward and a few beer bottles floating like rubber ducks in a bathtub. There is a shed adjacent to the springs. On the outside are the spray-painted words "Please help us keep this area CLEAN," the last word underlined three times. 199 ►

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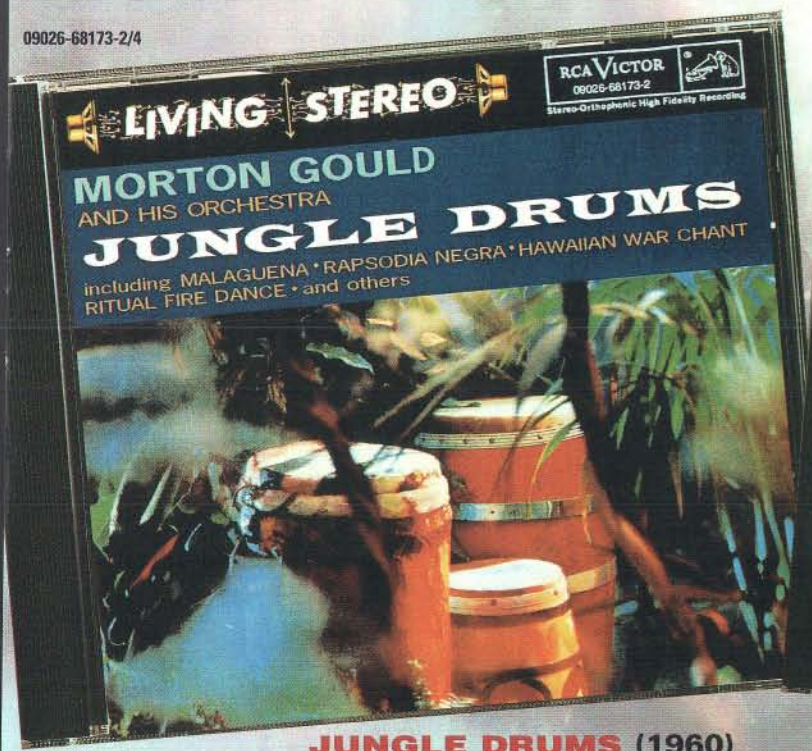


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**Movies of choice: *Angels and Insects, Babe, The Birdcage, Broken Arrow, The City of Lost Children, Dead Man Walking, Fargo, Heidi Fleiss: Hollywood Madam, Leaving Las Vegas, Rumble in the Bronx, Sense and Sensibility,* the *Star Wars* trilogy, *Taxi Driver.***

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# Gassée

◄ 196 Inside, the shed is full of trash. Nearby, a rusted diesel tank lies on its side.

Gassée hasn't made a move to take a dip, so I lean down, touch the water, and tell him that it isn't too hot for swimming. "That is not the issue," he replies. "I don't trust the water." I don't press the point. The place is disappointingly gross, and if J.-L. isn't going skinny-dipping, I really can't blame him. Instead, he opens the trunk of the Mercedes, removes his Nikon N90s, and photographs the overflowing garbage can, the rusted diesel tank, the inside of the shed, and an empty bag of Chips Ahoy! cookies floating on the water.

We hang out for maybe half an hour, get back in the car, and then Gassée discusses the future of computing. He predicts that one day we will have computerized eyeglasses in which information will be superimposed onto the lenses themselves. "A lot of information can be in the field of view without disturbing too much. It just came to me," he says. Also, computers will be able to start "reading our nerve impulses. They'll read the flow of electricity in the nervous system and do something about it." He discusses how Internet security is going to be messy because "people in the government are so illiterate. The FBI wants more authority and technology to spy on us." He explains how mathematics has reached a point where anyone can make a message that is unbreakable. And he says that it is possible to hide messages in pixels in Photoshop or to hide digital documents as noise in audio transmissions. He also thinks that at some point this year, we'll all be able to "efficiently buy things safely" on the Web, which will have "more refined content and presentation."

At this point, I'm in the backseat while the photographer sits up front, asking all sorts of questions about *Libération*, the French publication to which Gassée still contributes a weekly column, and about Paris, where Gassée still maintains a house that he visits twice a year with his family and friends, spending a lot of the time seated around a big table eating large meals. As we drive into a desert crossroads, somebody points out a sign that reads "Congested area – discharging of firearms prohibited."

Gassée is in a hurry to get back. While we ingest take-out sandwiches in Truckee, he refuels and makes a few calls on his cell phone. What does he think of Bill Gates? "Bill is very successful. Bill is Bill. The company is well managed. They are also wonderful intellectual terrorists."

By five in the afternoon, we have reached the 13-hour point and are all pretty wiped when a major freeway backup makes it obvious that no matter how fast he pushes those eight cylinders, Gassée will never make it back in time for his exhibit opening. Oh, he gets a little tense at first; the photographer is shooting photos through the rearview mirror and playing with the electronic headrest adjuster. But after a while, there is nothing left to do but make the most of the situation and stare out at the sun as it sinks slowly into the Pacific, creating a palette of soft, hypnotic colors that haven't yet been discovered, at least not by Photoshop. It's the kind of scene that would bring out the romantic in the most technocentric capitalist. It somehow brings me back to words Gassée had uttered in a less tranquil moment: "The romance of Silicon Valley was about money – excuse me, about changing the world, one million dollars at a time."

**"I came from France – I spoke my mind. It's a more abrasive culture. In retrospect, I blush at all the stupid things I said."**

Such frank talk doesn't go over well in a region that runs as much on optimism and delusion as it does on tiny chips, and part of this Frenchman's appeal is his cultural inclination to be playfully honest – even if it makes him as iconoclastic as his new machine. I suppose that makes Jean-Louis Gassée the metonymical link between the latest box and the geeks who like to distinguish themselves as hood-lifters. It is something I think about as we pull into the garage in which we met 14 hours earlier, transferring towels and unused spare underwear from one car trunk to another. No, it doesn't make my nipples hard, but it gives me something to ponder on the way home. ■ ■ ■

Message 35:
Date: 5.1.96
From: <nicholas@media.mit.edu>
To: <lr@wired.com>
Subject:

# Caught Browsing Again

Browsing is an obvious idea, but it is not necessarily the right one. Too much of the Net's future is staked on this unchallenged notion. And the sooner we stop relying on this concept, the better. Just think: How much browsing do you do in real life, or, as John Perry Barlow would say, in "meatspace"? Most working adults don't have time to spare. Browsing is better suited to the confines of a doctor's waiting room, an airplane seat, or a rainy Sunday afternoon. Rarely does browsing suggest the serious, productive use of one's time. Rather, it suggests another era, when work, home life, and vacations were less entwined than they are today.

So what happened? Why did we suddenly elevate this faulty, serendipitous, and almost haphazard process to its current prominence – even predominance – on the Internet? The verb *browse* is derived from the behavior of hungry animals who, in winter when pasture is barren, forage for tender shoots and the buds of trees and bushes. This implies that there isn't a lot to choose from and that what *is* good needs to be actively sought out.

**Why did we suddenly elevate this faulty, serendipitous, and almost haphazard process to its current prominence?**

But browsing takes time – the one thing most of us don't have. For example, I do far less window-shopping than I did when I was young (and yes, I miss it). Undeniably, browsing can be fun and useful but, as with tourism, only so much and so often. Funny how we use the words *cruising* and *surfing* to describe our behavior on the Web. How often do we invoke the words *learning* or *engaging* when we browse?

The Web is a digital landmark, as important as the Net itself. Its inventors, Tim Berners-Lee and his colleagues, will probably never fully realize how important their contributions were, and will continue to be, because the Web can be viewed in so many different ways. For me, it's less about multimedia or hyperlinks and more about turning the Net inside out. Instead of sending email to an individual – or to a list of individuals – I can now post a message and invite people to look it over. Sure, we've always had bulletin boards, telnet, and ftp on the Net, but the Web created a new and more accessible subworld, one more like the window-shopping experience than the original message-passing rubric. And in a way, that's a shame.

Think of the change this way: the Internet is now like a city – people go places, visit communities. In fact, we even call our own pages "home." But when we arrive at a place and try to make things happen, we often end up frustrated.

## Direct manipulation doesn't work

After years of work to make computers more accessible, researchers began questioning whether people really wanted ease of use in the first place. Using a computer is often just a means to an end, so wouldn't that end be better served if we could delegate tedious computer time to someone – or something – else?

As far back as 25 years ago, Alan Kay and others suggested that "delegation" was a much better metaphor than "direct manipulation" when focusing on people's productive use of computers. Later, at Apple – the font of many human-interface advances – delegation became the challenge and "interface agents" became the solution, at first in name only. Instead of constructing a computer that is easy to manipulate directly, the argument goes, why not fashion it after a well-trained English butler who knows you so well that he will do almost everything on your behalf. He will do what you ask and, in some cases, you won't even have to ask.

Most important, the idea of an interface agent entails its ability to "understand what I mean." Please just *do it* and don't bother me. When it comes to interaction with such an agent, less is more. Let it do the searching, surfing, and cruising. Let it browse for you and bring you the fruits of its labors.

## The net population of the Net

In America today, the demographics of personal-computer use is oddly bimodal. Most kids have some access. But, surprisingly, the next largest and fastest growing group (as a percentage of the age group per capita) is those age 55 and older (more than 30 percent of whom own a personal computer). Between these two groups, we have what I call the "digital homeless": those who arrived on the planet a little too early, or not early enough, to have the time to explore the possibilities of being digital. Many people in this group feel that the online world has nothing to do with them and (according to a report in *Business Week*) value their hair dryer more than a personal computer.

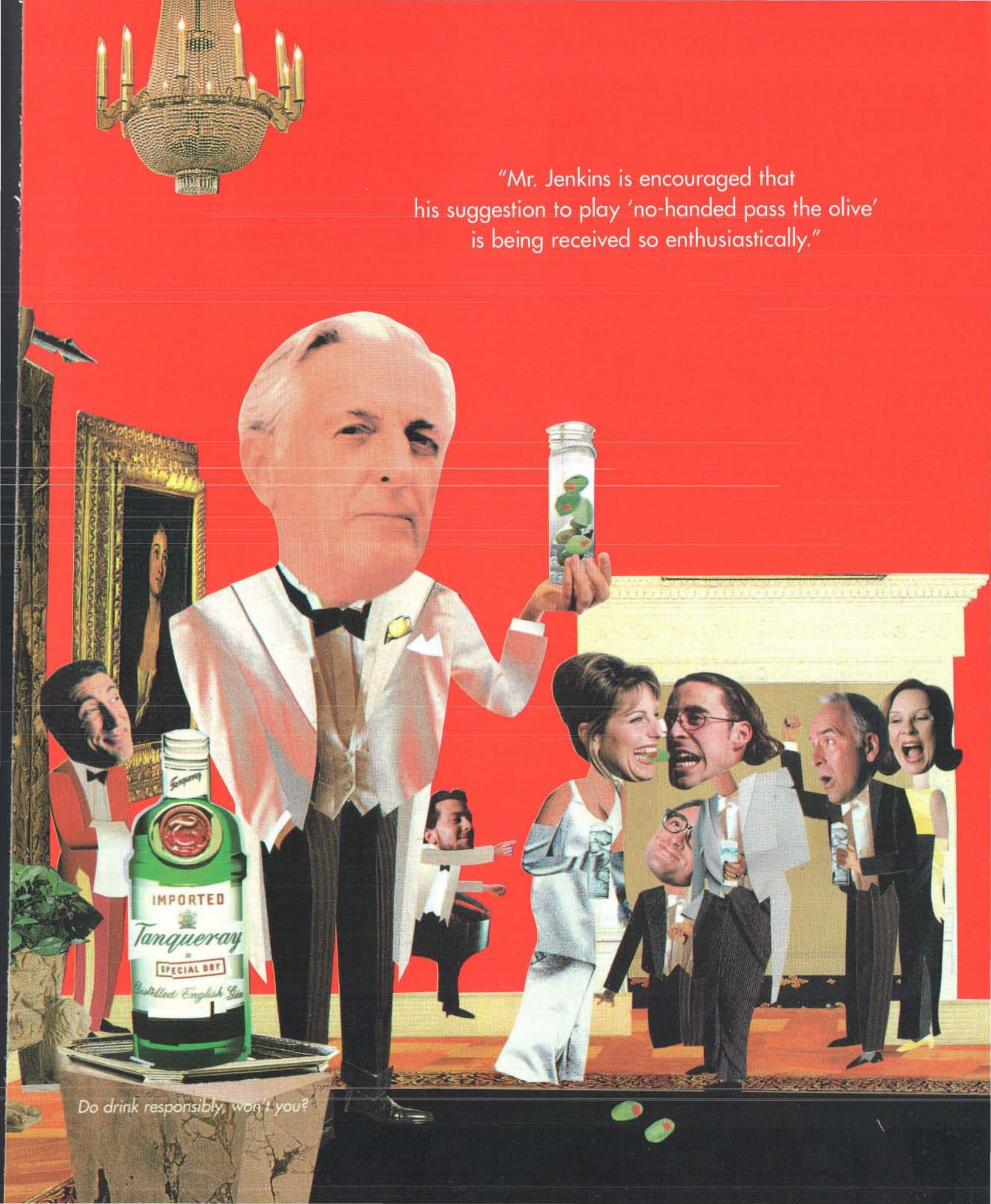
Among those who are digital, particularly the young and the old, we find a majority of people with free or flexible time, people who can literally afford to spend their time browsing. I cannot. I need to delegate that process. And I'm not alone.

By 2000, we can expect a billion users on the Net. As recently as a year ago, this number seemed outrageously high. Today it is considered a conservative estimate. What this statistic fails to include is the huge number of machines and software programs that will use the Net on our (and their own) behalf. At the turn of the millennium, we're likely to find those billion human users joined by a much larger number of software agents, Web crawlers, and other computer programs that will do the browsing for us. The Net will be roamed mostly by programs, not people. When people *do* use the Net, it will be for more suitable purposes: communicating, learning, experiencing.

The idea that machines, not people, will dominate Net usage turns the model upside down, not just inside out. Suddenly "pages," if that's even an appropriate term, will need more and more computer-readable hooks so that programs can see what you or I view from the corner of our eye. When we browse, our eyes gravitate toward images – in the future, these images will need simple digital captions. This will certainly take steam out of the Net-based advertising we know today. Simply put, our eyeballs may not be there to see it. ■ ■ ■

*Next Issue: Who Will the Next Billion Users Be?*

ORIGINAL PHOTO: STEVE DOUBLE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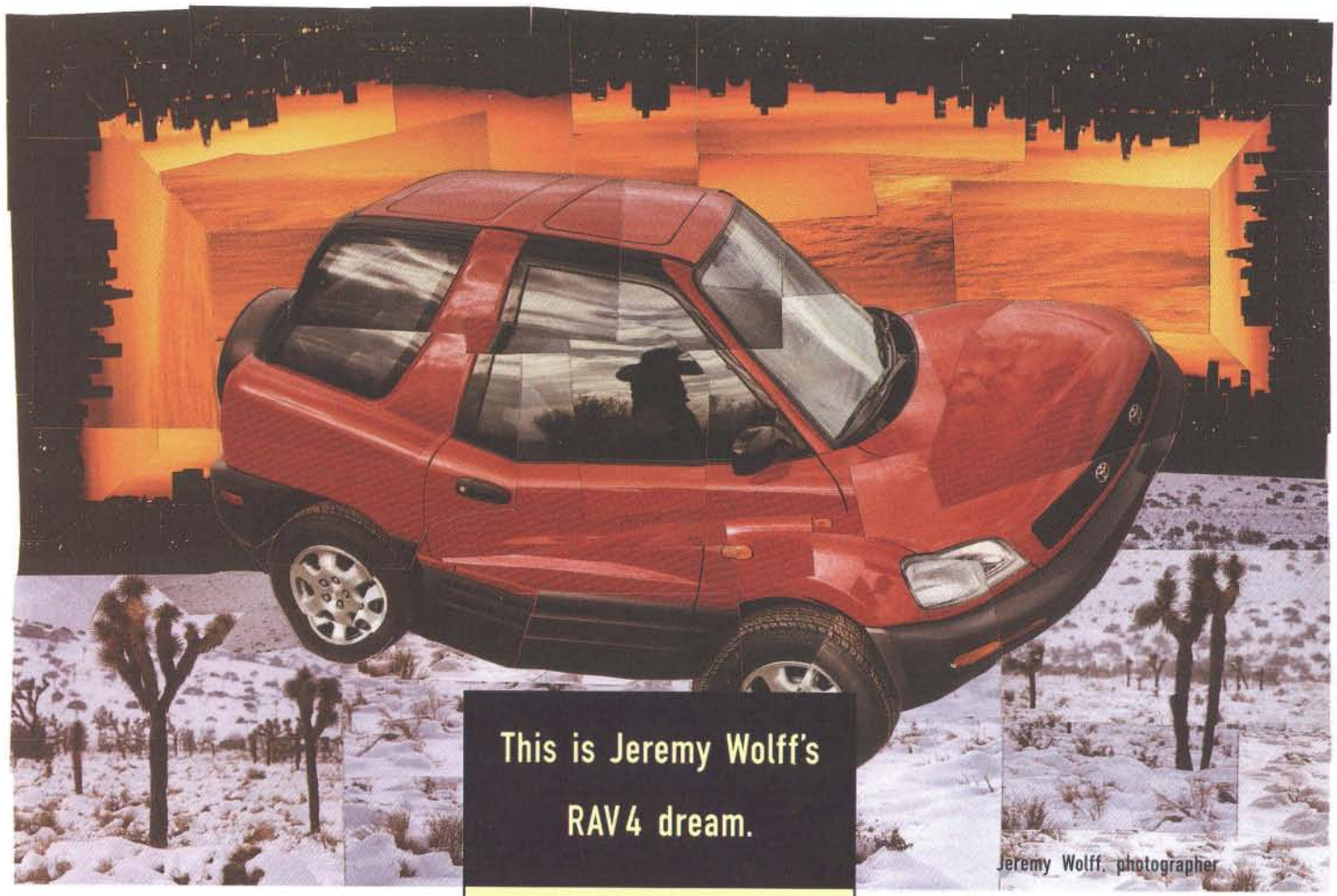

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